

## Chapter 4. Environmental Consequences

### Introduction

This chapter describes the environmental consequences of implementing proposed management actions from the Preferred Alternative described in Chapter 2. The purpose of this chapter is to determine the potential for significant impacts of the actions proposed in the Preferred Alternative on the human environment. As defined in 40 Code of Federal Regulations (CFR) Section 1508.14, the human environment is interpreted comprehensively to include natural and physical resources and the relationship of people with those resources. This chapter discusses the potential effects of management actions on various environmental, socioeconomic, and land use program areas.

For the purpose of this document the terms impacts and effects are synonymous. The Council on Environmental Quality directs federal agencies to examine three types of effects of their decisions: direct, indirect, and cumulative. Direct effects occur at the same time and place as the federal action or decision (in this case the Proposed Resource Management Plan [PRMP]); indirect effects are caused by the decision, take place at a later time or are farther removed in distance, but are still reasonably foreseeable. "Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Effects are also defined as adverse or beneficial. An effect is considered adverse when the outcome of the action results in undesirable effects. A beneficial impact can result if the current condition is improved or if an existing undesirable effect is lessened. Both adverse and beneficial effects of management actions are described in this document; discussions focus on effects considered to be substantive.

### Environmental Consequences of the Preferred Alternative

Throughout this analysis, assumptions about expected future actions or conditions, or general relationships between the decisions being made and expected environmental consequences, are used to facilitate the analysis. Some basic assumptions used for all resources are described below.

All decisions made by the PRMP would be in accordance with national policy and direction, and would be in force until a revised or amended land use plan changes those decisions. All PRMP decisions anticipate continuation of all valid existing rights. Currently authorized permits would be brought into compliance with new requirements as soon as is reasonably practicable following the Record of Decision (ROD) and in accordance with legal authorities that guide those permits.

The PRMP is expected to guide land use activities for the next 15 to 20 years.

The Preferred Alternative describes future actions needed to implement management direction that will require funding and personnel. For many program areas, past funding has been insufficient to meet demands; future funding levels are uncertain but are not likely to show substantial increases. For the purposes of this analysis, it was assumed that existing resources and personnel would be redistributed to respond to new priorities set by this plan, although the amount of work accomplished annually to meet plan direction would continue to depend on annual budgets and overall Bureau of Land Management (BLM) priorities. Full plan implementation assumes increased cooperation with other agencies, supplemental funding and resources supplied through grants, and an active volunteer program.

Measures that would avoid, minimize, rectify, reduce, or compensate for any potential adverse environmental effects of implementing the Preferred Alternative are summarized in Chapter 2. All analyses presented here incorporate those requirements. Acreage figures and other numbers used in this analysis are approximate projections only for comparison and analytic purposes. They do not reflect exact measurements or precise calculations.

### **Organization of Resource-Specific Environmental Consequences**

Discussions of environmental consequences for each resource and resource use follow the outline described below:

#### ***Methodology, Assumptions, and Incomplete Information***

Each resource section begins by discussing the methodology used for the analysis of environmental consequences and the basic assumptions that were used to support the impacts analysis. Examples of what would be included under assumptions include what data and indicators were used to evaluate effects, where the data came from (e.g., past observations, literature, professional judgment, or modeling), the analysis boundaries, technical assumptions, and how impacts were analyzed. Incomplete or unavailable information is also documented as applicable.

#### ***Analysis***

This section describes impact intensity criteria that are used for analyzing the intensity of effects on the specific resource or land use. These intensity criteria are used for comparison of the degree of effects between alternatives. They are defined in each section under Negligible, Minor, Moderate, and Major impacts.

#### ***Analysis of the Preferred Alternative***

This section describes general impacts that would result from implementing management actions from the Preferred Alternative on the resource or land use under consideration. Detailed information is not provided for resources with little to no anticipated effects.

#### ***Cumulative Effects***

This section describes cumulative effects are the combination of direct and indirect effects of the decisions made here, combined with other continued trends or anticipated effects that are outside the scope of the PRMP decisions

#### ***Mitigation Measures***

This section describes mitigation measures that would be implemented to mitigate substantive impacts resulting from the Preferred Alternative.

#### ***Unavoidable Adverse Impacts***

This section describes adverse impacts to a resource that are considered “unavoidable”, from implementing the Preferred Alternative.

***Short-Term Uses Versus Long-Term Productivity***

This section describes how short-term uses of a resource may result in degradation of, or benefit to, long-term productivity of that resource.

***Irreversible and Irretrievable Impacts***

This section describes significant impacts to a resource that are considered “irreversible”; that is, the resource will not return to its original state or condition.

## **4.1 Potential Effects on Air Resources**

This section describes the potential impacts on air resources from implementing the Preferred Alternative.

### **4.1.1 Methodology and Assumptions**

Sources of air pollutants include smoke from wildland fire and prescribed burning, vehicular and equipment emissions, and fugitive dust from construction and the use of unsurfaced roads.

Smoke from wildland fires and prescribed burning is expected to result in the greatest impacts on air quality. Wildland fire use (WFO) applies naturally ignited fire to protect, maintain, and enhance resources. In these areas fire would be allowed to function in its natural ecological role.

Wildland fires from within the Alturas Field Office (AFO) area and from upwind sources would result in sporadic smoke impacts in summer. Wildfires are expected to burn at a greater intensity than prescribed burns and thus create more potential for degrading air quality. Reduced fire intensity, less air quality degradation, and fewer acres burned by wildfire in the long term are expected to result from actions that do the following:

- perform more fuels treatment,
- use full suppression on less land, and
- apply the appropriate management response (AMR) suppression prescription to more land.

Prescribed fire would be used to protect, maintain, and enhance resources. All prescribed burning would comply with the California Smoke Management Guidelines for Agricultural and Prescribed Burning. The use of prescribed fire would be based on approved burn plans and would follow project-specific prescriptions within these burn plans. Impacts from prescribed fire were assumed to be generally proportional to the acreage treated, with generalized consideration given to any differences in vegetation types treated.

Smoke emissions from prescribed burning generally would dissipate in the direction of the most common winds. Ecosystems that contain more overall biomass would yield more smoke than more lightly vegetated rangelands and shrub-steppe ecosystems. Smoke management strategies are becoming more and more complex as fire is used more frequently to preserve, restore, or maintain rangeland health and reduce hazardous fuels.

In general, use of prescribed fire and WFO would reduce emissions over the long term by reducing fuel loads but would more consistently generate emissions on an annual basis because

- naturally ignited fires would be allowed to burn (as opposed to being subjected to suppression under AMR or full suppression strategies), and
- prescribed burns would be regularly conducted.

Fugitive dust from vehicle travel usually settles quickly and remains relatively close to the point of origin, resulting in only localized effects. Other sources of emissions (emissions from vehicles, minerals exploration, and construction) generally would be localized and short lasting.

### 4.1.2 Incomplete or Unavailable Information

We cannot accurately predict the acreage of lands subject to wildfire in any given year. Consequently, we describe the potential effects of wildfire in relative terms by the extent of fuels treatments and the assigned suppression prescription. Because the ranges of acreages proposed for prescribed burning are generally broad, we cannot precisely determine annual emissions from prescribed burning. Therefore, we also describe the potential effects of prescribed burns in relative terms. We do not have information on, nor do we measure, the amount of airborne fugitive dust resulting from the following:

- operating vehicles on paved and unpaved roads,
- construction and other earth-moving activities, and
- soil disturbance.

### 4.1.3 Analysis

We used the following impact thresholds for analyzing the intensity of effects on human health and air quality related values.

**Negligible:** Air quality would not change, or changes in air quality would be below or at the level of detection and, if detected, the effects would be considered slight.

**Minor:** Air quality would measurably change, but the changes would be small and local. No air quality mitigating measures would be needed.

**Moderate:** Air quality would measurably change and would have appreciable consequences, but the effect would be relatively local. Air quality mitigating measures would be needed and would probably be successful.

**Major:** Air quality would measurably change, would have substantial consequences, and would be noticed regionally. Air quality mitigating measures would be needed, and their success would be uncertain.

### 4.1.4 Analysis of the Preferred Alternative

Most of the field office area would be subject to full fire suppression. Effects on air quality, including visibility and human health, would conform to current programs and policies. Prescribed fire and wildland fire would generate smoke that might cause a temporary localized conflict with residents, recreational users, and other visitors.

Motorized vehicles (including recreational vehicles) and any equipment with an internal combustion engine would emit pollutants, including ozone precursors (reactive organic gases and nitrogen oxides), carbon monoxide, and particulate matter less than 10 micrometers in diameter (PM<sub>10</sub>). The use of unsurfaced roads, recreational off-highway vehicles (OHVs), and construction would generate localized fugitive dust. Vehicular and equipment emissions and fugitive dust from the use of unsurfaced roads—as well as timber harvest, construction, and other activities from new projects that would be undertaken—would require site-specific National Environmental Policy Act (NEPA) analysis. Suitable management practices would be applied in compliance with NEPA.

Prescribed burning of 500–10,000 acres per year and WFU of 69,000 acres would result in a somewhat higher level of emissions than currently. Somewhat greater wildland fire emissions would also result from the use of appropriate management response in place of full suppression.

Prescribed burning and other fuels management activities would attenuate wildland fire intensity over the long term as fuel loads are reduced. Adverse short-term impacts to air quality would be negligible to slight. Moderate beneficial long-term impacts would result from actions to reduce smoke from catastrophic wildfires.

### **4.1.5 Cumulative Effects**

Smoke from prescribed or wildland fires burning simultaneously in the following adjacent areas would significantly lower the air quality of northeast California and northwest Nevada:

- Modoc National Forest,
- BLM AFO,
- BLM Lakeview Field Office,
- BLM Winnemucca field Office,
- Sheldon National Wildlife Refuge,
- Hart Mountain National Antelope Refuge, and
- private and state lands.

Prevailing winds in the area blow from the south and southwest. As a result, multiple fires could degrade air quality in Southern Oregon and northwest Nevada. Several prescribed fires are not likely to burn at the same time because the AFO coordinates its burn plans with other BLM field offices and offices of the U.S. Department of Agriculture (USDA) Forest Service and California Department of Forestry and Fire Protection (CDF). However, large wildland fires or escaped prescribed fires could burn in several areas at one time, significantly degrading air quality. No significant cumulative effects are expected.

### **4.1.6 Mitigation Measures**

No major adverse air quality impacts are projected. The following mitigating measures may be implemented to further minimize air quality emissions from the proposed management actions.

Prescribed burning would be concentrated in spring (mid-April through mid-June) and fall (mid-September through mid-November) to avoid coinciding with peak summer levels of air pollutants from other human-caused activities in the area and the winter inversion potential. Computer modeling to assess smoke dispersion, and related smoke management techniques can help reduce the potential that prescribed burning would degrade air quality.

### **4.1.7 Unavoidable Adverse Impacts**

The adverse effects on air quality would be short term and limited to the local region. The intensity of effects would range from negligible to moderate, with most prescribed and wildland use fires causing minor effects.

Fugitive dust from roads with current traffic use would produce short-term local effects of negligible intensity. Large wildland fires or escaped prescribed fires could burn in several areas at one time, significantly degrading air quality.

Sources outside the field office area releasing pollutants during the same time could produce more intense but still moderately adverse effects throughout the area.

#### **4.1.8 Short-Term Uses Versus Long-Term Productivity**

Prescribed fire may degrade (minor effects) air quality over the short term by increasing windborne particulates (PM<sub>10</sub> and particulate matter less than 2.5 micrometers in diameter) due to smoke and vegetation loss. This short-term increase in local and sub-regional smoke from prescribed burns must be compared to the large regional smoke plumes of wildfires that can be expected without prescribed burning over the long term. Prescribed fires are planned and implemented to accelerate ecosystem and plant community recovery to a healthier and more vigorous state. In the long term, they benefit air quality.

#### **4.1.9 Irreversible and Irretrievable Impacts**

With proper management and remediation, no projected irreversible or irretrievable air quality impacts would result from the proposed prescribed burning alternatives.

## 4.2 Potential Effects on Cultural and Paleontological Resources

This section describes the direct, indirect, and cumulative effects to cultural and paleontological resources as a result of implementing the Preferred Alternative. The overall cultural resource sensitivity of the AFO is considered to be high, while paleontological resource sensitivity is relatively low. Management objectives for cultural and paleontological resources are likely to conflict with specific land use objectives.

### 4.2.1 Methodology and Assumptions

Assumptions regarding the future management of cultural and paleontological resources in the AFO area are as follows: BLM will comply with all federal and state cultural resource laws and regulations, including Sections 106 and 110 of the National Historic Preservation Act (NHPA), the American Indian Religious Freedom Act, 36 CFR 800 (Protection of Historic and Cultural Properties), Executive Order 13007 (Sacred Sites), and BLM's National Programmatic Agreement with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Offices (SHPOs). In addition, BLM will conduct consultation with appropriate Native American groups and the California SHPO. Finally, BLM will work in accordance with the Protocol Agreement established between BLM and the California SHPOs which specify the approach for cultural resources protection, including issues such as site identification, interpretation, and protection and stabilization efforts.

Assumptions regarding impacts to cultural and paleontological resources were also made. Archaeological remains are widely recognized as being limited in number, nonrenewable, and fragile resources (Nickens 1991; Williamson and Blackburn 1990). These resources consist predominantly of the physical evidence or cultural debris left on the landscape by past societies. It is critical to understanding the discussions of existing conditions and effects related to cultural and paleontological resources in this PRMP by examining what impacts are and how the loss of such resources occurs. The following paragraphs provide this necessary background.

### 4.2.2 Impacts

Impacts were assessed using criteria defined by regulations for *Protection of Historic Properties* (36 CFR Part 800). An effect is a direct or indirect alteration of the characteristics of an historic property that qualifies it for inclusion in the National Register of Historic Places (NRHP). Effects are adverse when the alterations diminish the integrity of a property's location, design, setting, materials, workmanship, feeling, or association. Examples of adverse effects include but are not limited to the following:

- Physically destroying a property
- Inappropriately altering a property by not following the Secretary of the Interior's Standards for Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines
- Moving a property from its historic location
- Changing the physical features within the property's setting that contribute to its historical significance
- Introducing visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features
- Transferring, selling, or leasing a property out of federal ownership or control without adequate restrictions to ensure preservation.



### Impacts from Natural Agents

The activities of various plants and animals and erosive actions of wind, water, and temperature have major impacts on cultural materials in the archaeological context, leading to loss of artifacts and features, and abundant variation in the record (Mathewson 1989; Schiffer 1987; Wildesen 1982). These impacts can take the form of bioturbation or churning of the soil as a result of rodent activity, the downslope movement of artifacts and cultural soils as a result of erosional processes and the deterioration of standing structures from moisture and heat. Overall these effects are cumulative, generally resulting in a loss of archaeological data that would render a site ineligible for the NRHP.

### Impacts from Human Agents

Human-caused actions which have harmful effects on archaeological and paleontological properties and data are complex, and continue to increase as populations expand into undeveloped areas. These human agents can be divided into incidental and intentional actions, which are discussed in the following paragraphs.

#### *Incidental Actions*

These activities may be defined as those destructive actions associated with the many forms of resource development, protection, and use that take place on the landscape. Although the loss of data and disturbance of cultural and paleontological properties are not intended, the end result is that part of the record disappears from the landscape. In this PRMP, these activities are categorized as energy or minerals development; utilities and telecommunication developments; grazing, rangeland improvements or water development projects; recreational pursuit; construction, maintenance and improvement of roads; fire suppression and fuels treatments; timber harvesting activities; and protection and habitat enhancement of botanical or biological resources.

#### *Intentional Actions*

Intentional actions which lead to loss of archaeological sites and data are critical in that they are inherently harmful to the resource base. The worst of these actions, those related to vandalism, are particularly damaging since they lead to destruction without any return of scientific information. Intentional destructive actions include but are not limited to:

- Excavation (digging, pothunting, use of heavy machinery)
- Carving, scratching, chipping, general defacement
- Surface collection of artifacts
- Removing, shooting at, painting, chalking, making casts and tracings of rock art
- Theft of artifacts from structures, stripping weathered boards or other timbers, breaking artifacts, objects, windows
- Removing part or all of a structure, causing structural damage or knocking structures over
- Dismantling, general destruction of structure (but apparently no removal)
- Arson
- Climbing or walking on resources
- Building new roads over, using modern vehicles on historic roads, off-road recreational vehicle use
- Rearrangement of or relocating of resources
- Use as firewood

The NHPA requires agencies to take into consideration the effects of their actions on properties listed or eligible for listing on the NRHP. Significant cultural resource properties and Native American traditional cultural properties (TCPs) would be protected by management strategies designed to preserve such sites for future scientific research, recreational uses, educational use, or Native American use.

Paleontological properties are covered under the Paleontological Resources Protection Act. The act directs federal agencies to coordinate the management and protection of paleontological resources on Federal lands using scientific principles and expertise. It also directs agencies to develop appropriate plans for paleontological resources that address inventory, monitoring, and scientific and educational use. The existing 43 CFR 3809 regulations do not contain a process for inventory and evaluation of paleontological resources like the procedures for cultural resources under the NHPA. The existing regulations state that operators cannot knowingly disturb, alter, injure, or destroy any scientifically important paleontological remains.

### 4.2.3 Incomplete or Unavailable Information

A Class I Cultural Resource Overview was compiled in 2004 for the AFO (Far Western Anthropological Resource Group). This document outlines gaps in the cultural resource database, and makes recommendations to address these gaps. Missing or incomplete information identified as a result of the overview includes but is not limited to: lack of survey to identify cultural resources and lack of proper recordation and evaluation of sites encountered. All sites recorded within the field office area prior to 1980 lack complete site records. Until recently, non-project related surveys were not routinely conducted; as a result, only 5% of the resource area has been surveyed. Only two culturally sensitive and/or sacred sites have been identified or investigated, leaving potential TCPs undesignated.

### 4.2.4 Analysis

The NHPA requires agencies to take into account the effects of their actions on properties listed or eligible for listing on the NRHP. The process begins with the identification and evaluation of cultural resources for NRHP eligibility, followed by an assessment of effects on eligible resources. The process concludes after consultation. If an action could change in any way the characteristics that qualify the resource for inclusion on the NRHP, it is considered to have an effect. “No adverse effect” means there could be an effect, but the effect would not be harmful to the characteristics that qualify the resource for inclusion on the NRHP. Adverse effect means the action could diminish the integrity of the characteristics that qualify the resource for the NRHP.

In the following sections, the analysis of the impacts is considered based on the proposed land use management actions and their potential level of impact to cultural and paleontological resources. For the purposes of this analysis, the levels of impacts to these resources were defined using 36 CFR Part 800 as a guide and modified as follows:

**Negligible:** The effect on cultural and paleontological sites would be at the lowest levels of detection – barely measurable with any perceptible consequences, either beneficial or adverse, on cultural resources. For purposes of Section 106, the site's NRHP eligibility would not be threatened, and the determination of effect would be *no adverse effect*.

**Minor:** The effect on cultural or paleontological sites would be measurable or perceptible, but it would be slight and localized within a relatively small area for a site or group of sites. The action would not affect the character or diminish the features of a NRHP-eligible or listed archaeological site and would not have a permanent effect on the integrity of any cultural resource site. For the purposes of Section 106, the site's NRHP eligibility would remain intact, and the determination of effect would be *no adverse effect*.

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A beneficial minor effect would involve the maintenance and preservation of sites. For purposes of Section 106, the determination of effect would be *no adverse effect*.

**Moderate:** The effect would be measurable and perceptible. The action would change one or more character-defining features of a cultural resource, but it would not diminish the integrity of the resource to the extent that its NRHP eligibility would be jeopardized. For purposes of Section 106, the site's NRHP eligibility would be threatened, and the determination of effect would be *adverse effect*. A beneficial moderate effect would involve site stabilization. For purposes of Section 106, the determination of effect would be *no adverse effect*.

**Major:** The effect on cultural or paleontological sites would be substantial, noticeable, and permanent. For NRHP-eligible or listed archaeological sites, the action would change one or more character defining features of an archaeological resource, diminishing the integrity of the resource to the extent that it no longer would be eligible for listing in the NRHP. For purposes of Section 106, the site's NRHP eligibility would be lost, and the determination of effect would be *adverse effect*. A beneficial major effect would involve active intervention to preserve and improve sites. For purposes of Section 106, the determination of effect would be *no adverse effect*.

**Short Term:** The effect anticipated to occur within 1 to 5 years of implementation of the activity

**Long Term:** The effect that would occur after the first five years of implementation.

### 4.2.5 Impacts Common to All Cultural and Paleontological Resources

Goals and objectives for cultural and paleontological resources focus on compliance with existing laws, regulations, and Executive orders, in addition to the BLM-CA SHPO Protocol agreement, and the National Programmatic Agreement. Goals also include protection and preservation of archaeological, culturally significant, and paleontological sites, as well as consultation and coordination with Native American tribes.

Due to the nature of cultural and paleontological resources, it is difficult to state definitively what level of impacts can be expected at any site within a proposed management area. Negligible to moderate impacts on cultural and paleontological properties are expected as a result of land management activities, thus a range of impact levels is provided in this analysis. Management actions including recreation and OHV use, fire use and suppression, fuels treatments, road construction and maintenance, juniper treatment, timber harvesting activities, livestock grazing and range improvements all possess the potential to adversely affect sensitive cultural and paleontological properties.

Archaeological site vandalism and the unlicensed collection of artifacts and "digging" of sites are often indirect consequences of land management actions. Projects involving the construction, improvement, or maintenance of roadways have the potential to incur major effects to cultural and paleontological sites by facilitating public access to otherwise inaccessible areas.

Vandalism may be precipitated by the disclosure of site locations either inadvertently through "flag and avoid" tactics, or purposefully through the sharing of sensitive resource information with non project related personnel.

Emergency fire suppression activities would have minor to major effects on cultural and paleontological properties. Any fire, wild or prescribed, may result in cultural resources being damaged, destroyed or result in inadvertent exposure of sites to increased visibility and illegal collection activities.

High intensity wildland fires and prescribed burns would act to destroy or alter sensitive scientific data that can be gathered through the examination of obsidian hydration profiles. Fire use and fuels management actions that increase erosion, runoff and compaction rates of soils through vegetation loss and use of heavy equipment would engender minor to moderate adverse effects to cultural and paleontological resources located near or within such projects.

Fire rehabilitation efforts would generally increase the protection of cultural deposits that may have remained unaffected from wildland fire by preventing or reducing erosion and encouraging rapid revegetation of denuded surfaces. Potential impacts from rehabilitation activities, such as mechanical reseeding, would be mitigated under standard procedures.

Implementation of the Healthy Forest Initiative has the potential to incur minor to moderate impacts to cultural and paleontological resources through improved access to sites or the disclosure of site locations as a result of “flag and avoid” tactics. Long term potential disclosure of site locations would be a result of untreated islands or vegetation pockets that attract attention within treatment areas. Non-treated islands of cultural resources would have minor to moderate adverse effects as a result of livestock congregation within grazing allotments.

The development of public use fuel wood cutting areas would have minor to moderate effects to cultural resources as a result of increased access to archaeological or paleontological sites within the units. However, minor positive effects to archaeological sites within areas closed to fuel wood cutting would occur.

The construction of new permanent or temporary roads and the maintenance of existing roadways have the potential to cause negligible to major adverse effects to cultural and paleontological resources. These effects can be caused either indirectly by improving access to formerly remote areas, or directly through maintenance activities on roads that go through existing sites.

Vegetation treatment projects, including fuels reduction projects, will be mitigated to avoid direct impacts to cultural resources. Other vegetation treatment actions such as the Aspen Delineation Project would have minor effects to cultural resources located near or within aspen stands. The construction of exclosures or the introduction of fire has the potential to adversely affect resources that are located within or adjacent to treatment areas. The use of prescribed fire in oak woodland and curleaf mountain-mahogany stands would have negligible to minor effects on cultural or paleontological resources located within or adjacent to the treatment areas. Vegetation management aimed at improving the Sagebrush Steppe community has the potential for minor to major adverse impacts to cultural resources through the use of prescribed fire and/or mechanical treatments, improved access to and visibility of archaeological sites, and the use of herbicides in areas of culturally important plants.

Grazing and wild horse use in high sensitivity areas results in major long-term adverse effects to cultural resources (Foster-Curley 2003; Halford 1999; Horne and McFarland 1993; Osborne et al 1987). In general, there are three primary mechanisms to consider when addressing the effects of livestock grazing on cultural resources: 1) mechanical or physical impacts such as trampling, wallowing, and rubbing; 2) chemical impacts resulting from urine and feces; and 3) erosional impacts.

Livestock impact cultural resources through soil compaction and subsurface soil disturbance by trampling and pawing that mixes depositional associations and accelerates erosional processes; wallowing and trailing that results in the dispersion, breakage, and/or loss of artifacts and other data that inform archaeologists as to the age, use, and environmental setting of prehistoric sites; rubbing against standing structures; and chemical reactions to urine and feces that result in the accelerated deterioration of historic properties (ASPPN I-15, 1990; Nielson 1991; Osborn et al. 1987; Roney 1977).

Plants valued by Native American traditionalists are trampled or consumed by livestock, adversely affecting plant availability at some locations. For purposes of analysis, it is assumed that the impacts of livestock use are distributed in proportion to the actual distribution of livestock, with the most intensive impacts occurring at livestock use concentration areas. Cultural resources located on lands having erosional or other types of watershed deterioration problems attributed to livestock use impacts are assumed to receive high impacts. Cultural resources are non-renewable, and impacts of livestock use on cultural resources are cumulative (Kobori et al 1980).

The management of riparian zones to improve water quality and aquatic habitat while reducing soil erosion would benefit cultural resources. Restricting livestock grazing along streams, stabilizing stream banks, and closing roads in or near riparian areas would maintain or enhance conditions of archaeological sites in these areas.

Recreational use would have negligible to moderate adverse impacts to cultural and paleontological resources through possible increased exposure of sites resulting in their use or disturbance, and the increased potential for vandalism and illegal artifact collection. Development and maintenance activities associated with the construction of campgrounds, trails, and viewing areas would have negligible to moderate adverse effects to cultural and paleontological sites. Construction of the Descent into Goose Lake interpretive site would have short-term moderate adverse effects to cultural resources in the vicinity. Overall, interpretive areas would have negligible to moderate adverse impacts in the short term, but ultimately long-term minor to moderate positive effects would be achieved through their development.

The creation of special recreation management areas (SRMAs) would have minor to moderate adverse short- and long-term effects as a result of the construction of facilities that would attract larger numbers of visitors to those areas. Projects implemented within these areas to protect cultural resources would likely also have minor to moderate adverse cumulative impacts by drawing attention to archaeological sites. Overall, special designations such as areas of critical environmental concern (ACECs) could provide indirect benefits to cultural and paleontological resources through the restriction of surface disturbance and increased law enforcement patrols.

OHV travel in sensitive areas would result in minor to moderate adverse effects to cultural and paleontological sites through soil compaction, displacement, rutting and other disturbance. Opportunities for increased looting or vandalism as a result of increased access would also occur.

The setting of Native American TCPs or sacred sites would be adversely affected through auditory or visual means by the use of OHVs within such areas. The proposed 80-acre Cinder Cone OHV management area would be designated as 'Open' to OHV use. The creation of an OHV play area would act to have long term moderate positive benefits as a result of providing the public with an alternative place to ride OHVs.

In addition, designations of ACECs and the identification of culturally significant properties would act to increase positive effects to cultural and paleontological deposits by promoting management goals focused on preserving such important areas.

### 4.2.6 Analysis of the Preferred Alternative

The Preferred Alternative would result in moderate to major adverse impacts and moderate beneficial effects to cultural resources.

Appropriate management response (AMR) on 434,045 acres and WFU on 69,000 acres would act to reduce fuel loads and create a more natural fire regime. This would reduce the potential for catastrophic fires that could adversely affect cultural and paleontological resources. The lack of mechanical harvesting and chemical treatments of fuels would have a negligible to major beneficial effect on cultural and paleontological deposits, by maintaining the inaccessibility of areas, and reducing the likelihood of inadvertent discovery and illegal collection. The lack of untreated islands of vegetation would reduce the use of such resources as shading and congregation areas for livestock, providing a minor to moderate long-term beneficial effect on cultural sites.

Prescribed fire for fuels treatment could occur on up to 10,000 acres annually, resulting in short-term negligible to minor adverse effects to cultural resources. The Section 106 process would be followed to avoid moderate to major impacts, and overall the use of prescribed fire could have a minor to moderate positive benefit to cultural resources through the reduction of heavy fuels.

Mechanical treatment of fuels could occur on 10,000 acres annually resulting in further minor to major long-term beneficial effects through the reduction of catastrophic fire. Biological and chemical treatments each on 1,000 acres per year would pose negligible to minor adverse effects to native plant gathering areas. Improperly managed chemical treatment could potentially result in soil contamination, which may render such gathering areas unusable. Improperly managed biological treatment (e.g., over grazing by goats) could result in soil compaction and too much vegetation removal.

The harvesting of timber on 13,800 acres, reforestation of 8000 acres, the mechanical treatment of juniper on 80,000 acres, and hand treatment of 2,000 acres represents the highest level of impacts to cultural and paleontological resources, due to the large treatment areas. Short-term effects to soil resources as a result of such activities would increase the effect to cultural sites through increased erosion and runoff, which acts to displace cultural materials from their depositional context. The construction of 10 miles of new permanent roads and 50 miles of temporary roads represents minor to major adverse effects to cultural resources located within treatment areas.

OHV use would be largely restricted to existing roads and trails. Where areas are designated as 'Open', minor to major adverse effects would occur as a result of trails cutting across resource sites, improved access for illegal artifact collection, and the breakage and dispersal of surface or subsurface cultural components. The Recreation Opportunity Spectrum (ROS) designation of 'Primitive' or 'Semi-primitive Non-motorized' (SPNM) would have negligible to minor long-term beneficial effects to cultural and paleontological resources. Prohibitions on camping within 200 feet of riparian and cultural resources would have a minor to moderate beneficial effect.

The designation of 29,171 acres of ACECs, including Yankee Jim Ranch, would provide additional protection for cultural and paleontological resources within such designated areas. The construction of viewing trails, interpretive sites, vehicle pull-outs, and barriers would act to enhance protection through increased law enforcement patrols, physical control of vehicle impacts to sites, and education of the public about sensitive resources. All construction activities would follow the Section 106 process and would not be implemented unless they enhanced or protected sites within the project vicinity.

The reinstatement of suspended animal unit months (AUMs) would have minor to major adverse effects to cultural and paleontological resources as a result of increased numbers congregating in high sensitivity areas (typically riparian). One hundred new water developments would be constructed, potentially having minor to major effects to cultural resources that had been largely undisturbed by grazing activities. The improved distribution of livestock may be a result of such construction, which could positively affect those resources that received high levels of use. Unless grazing practices are intensely managed, major short- and long-term adverse effects would occur.

The high number of acres ‘Open’ to mineral leasing, renewable energy development, mineral pit establishment (435,385) and flat rock collection (435,385), would have minor to major adverse impacts to cultural and paleontological resources due to surface disturbance, increased archaeological visibility, and increased access to remote areas. The added emphasis on accommodating development demands for rights-of-way (ROWs) and communications sites would cause a potentially greater impact on cultural resources from ground-disturbing activities. Compliance with Section 106 would minimize potential effects of utilities, transportation, and telecommunications activities on cultural resources by identifying significant cultural resources early in the planning process and appropriate measures to mitigate potential effects.

### 4.2.7 Cumulative Effects

Cumulative effects under current management from actions or activities by agencies or entities other than BLM could affect existing cultural and paleontological resources. Since only 5% of the AFO area has been surveyed, few districts, TCPs, significant landscapes, and sacred areas have been identified. It is difficult therefore to determine whether additional significant districts and landscapes exist and whether contributing elements exist on lands adjacent to BLM-administered land. Ground-disturbing activities and activities and actions that alter settings on adjacent government or private lands may affect the significance of potentially eligible districts and landscapes in these areas. Cumulative loss of significant resources may affect the eligibility of districts and cultural landscapes for listing in the NRHP.

Conversion of sagebrush habitats to agricultural use on adjacent private lands may disturb cultural resources by affecting the integrity of resources. In addition, conversion of habitat to residential use by private landowners, USDA Forest Service, U.S. Fish and Wildlife Service (USFWS), and the CDF may result in similar cumulative effects. Juniper treatment and logging on private lands may involve ground-disturbing activities that affect individual significant cultural resources and districts. All ground-disturbing activities and actions by agencies or entities other than BLM with the potential to affect the integrity of resources could result in cumulative effects on significant cultural resources.

Juniper treatment on federal lands would have minor to major cumulative effects to cultural and paleontological resources as a result of: increased erosion which acts to move surface artifacts and cultural soils from their depositional context; improved access to previously remote areas which acts to increase illegal artifact collection; the flag-and-avoid approach used as mitigation which through the lack of evaluation of potentially significant sites and districts, as well as the identification of cultural sites within untreated areas, results in the failure to collect additional data about resources that are necessary for relating them to larger regional and thematic districts or landscapes.

Cumulative effects to cultural resources as a result of livestock grazing include the loss of information and data that would render a site ineligible for the NRHP. Areas of high livestock concentration and trailing, coupled with long periods of use or early turn out dates, would have long-term cumulative effects that eventually result in the loss of the resource. BLM’s focus to manage livestock grazing would result in minor cumulative impacts to cultural resources.

### 4.2.8 Mitigation Measures

None.

### **4.2.9 Unavoidable Adverse Impacts**

The greatest threat of damage or destruction to cultural resources could result from casual, unauthorized activities (such as dispersed recreational activity, OHV use, and vandalism), natural processes (natural decay, deterioration, or erosion), and uncontrolled livestock grazing.

### **4.2.10 Short-Term Uses Versus Long-Term Productivity**

None

### **4.2.11 Irreversible and Irretrievable Impacts**

Casual, unauthorized activities (such as dispersed recreational activity, OHV use, and vandalism) natural processes (natural decay, deterioration, or erosion), and livestock grazing contribute to the deterioration and destruction of cultural resources. Once these resources are damaged, they can not be replaced. In addition, although management procedures would comply with federal laws and agency guidelines by providing a systematic means to proactively address direct impacts to cultural resources from authorized projects and activities, mitigation in the form of data recovery may be necessary on certain occasions. Once data recovery has been conducted at a given site it limits or diminishes potential opportunities for future research and interpretation.



### 4.3 Potential Effects on Economic Conditions

This section describes the potential impacts on economic conditions as a result of implementing proposed management actions under the Preferred Alternative.

#### 4.3.1 Methodology and Assumptions

The analysis of the economic impacts was based on the following assumptions:

- Quantitative impacts were limited to four management actions: fires and fuels, vegetation management, forestry, and grazing.
- All other management actions either were assumed to be equal or the physical effects of those actions could not be estimated in enough detail to allow for a quantitative evaluation. For management actions that could not be estimated quantitatively, a qualitative evaluation was prepared.
- The economic evaluation for the AFO area was limited to Lassen and Modoc Counties.

We used the following procedure to estimate the economic effects of each management action. First, we estimated the change in regional spending for each action. These estimates included increases in spending in the local economy, such as hiring local firms to mechanically harvest juniper. We also estimated decreased spending resulting from actions such as reductions in grazing allotments.

The changes in regional spending that would indirectly affect the local economy included effects on personal income and employment. For example, a local firm hired to harvest juniper would purchase food and supplies in the local economy, indirectly benefiting other businesses. We estimated the indirect and induced effects on the regional economy using the IMPLAN model.

IMPLAN is an economic input-output model that can be used to estimate the economic impacts of a project or program on an individual county or on a regional, multi-county area. A single county represents the smallest economic unit that can be specified within IMPLAN. Portions of counties cannot be selected. The model originally was developed by USDA Forest Service, and it is widely used throughout the U.S. to estimate economic impacts (IMPLAN 2004).

To run the IMPLAN model, we had to first specify the counties involved with the project or plan. We assumed the local economy for the AFO area to include Lassen and Modoc Counties. Although portions of other counties are included in this field office area, these two counties best represent the area where local impacts would be felt.

After defining the project area, we entered the direct impacts into the model. The model uses a system of multipliers to estimate the indirect and induced effects on the local economy, including the impacts on regional income and employment. IMPLAN defines the direct effects as the impacts of businesses purchasing from other businesses. Induced effects are those resulting from changes in household spending. The approach used to estimate the economic impacts for the four management actions first involved estimating the direct costs of those actions. We estimated direct costs as described below.

Once the increase and decrease in spending for each management action were estimated, they were entered into the IMPLAN model. We then used the model to estimate the change in regional personal income and employment from each management action.

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The following assumptions were used in estimating direct costs for management actions for fire and fuels, vegetation, forestry, and grazing.

Vegetation can be treated to reduce fire and fuels in one of four ways: prescribed burning, mechanical treatment, chemical treatment, and biological treatment. Of the four, we assumed that the existing BLM staff would conduct prescribed burning. No subcontracting would be required, and regional spending would not change. On the basis of this assumption, the increase in BLM's local spending for supplies for prescribed burning would be negligible. In contrast, we assumed that BLM would contract out mechanical treatment to local businesses.

For the AFO area, we assumed that one-third of the mechanically treated fuels acreage would be chipped and hauled offsite and two-thirds would be chipped and left onsite. For the fuels hauled offsite, we assumed that 11.6 bone dry tons (BDT) would be generated per acre and the contractor would receive a fee of \$95 per BDT (BLM 2004d). For mechanically treated fuels in which the chipped fuels are left onsite, we assumed treatment costs of \$225 per acre (Lynch and Mackes 2003). We further assumed that chemical and biological fuel treatments would be a minor component of fuels treatment, and we did not evaluate these treatment options quantitatively.

Vegetation management mainly consists of juniper control and includes prescribed burning, mechanical harvesting, and manual harvesting. This category also includes control of noxious weeds and road building to access areas where vegetation operations are conducted. As with fire and fuels management, the existing BLM staff would conduct prescribed burning, and no subcontracting would be needed. We assumed that BLM would contract out both mechanical and manual harvesting.

We assumed that mechanically harvested vegetation would be hauled offsite for biomass energy generation, with 11.6 BDT generated per acre and that the contractor would receive a fee of \$95 per BDT (BLM 2004d). For manual treatment areas, we assumed that vegetation would be left onsite, with contractors receiving a fee of \$163 per acre (Lynch and Mackes 2003).

In our economic analysis we also assumed that BLM would contract out all road building. We assumed a cost of \$10,000 per mile for road construction and that all roads would be unpaved. Because cost information on noxious weed control was unavailable, we did not quantitatively evaluate this vegetation control technique.

Forestry management includes logging, mechanical harvesting, manual thinning, and reforestation. For each of these categories, contracting would be required; resulting in spending that would benefit the local economy. For mechanical treatment, we assumed the following:

- all materials would be hauled offsite,
- 11.6 BDT would be generated per acre, and
- the contractor would receive a fee of \$95 per BDT (BLM 2004d).

For manual treatment areas, we assumed that fuels would be left onsite and contractors would receive a fee of \$163 per acre. We also assumed that reforestation costs would equal \$500 per acre (California Department of Forestry and Fire Protection 2003).

Reductions in grazing would affect the local economy because reduced sizes of cattle herds would directly affect ranchers. Ranchers would be forced to reduce their herd sizes, and these reductions would indirectly affect businesses dependent on those ranches for part of their income.

We quantitatively evaluated the economic effects of changes in grazing allotments, assuming a cost of \$790 per head of cattle (California Agricultural Statistics Service 2004b, 2004c). This per-head estimate represents the revenue forgone by not grazing a head of livestock.

### 4.3.2 Analysis

For this analysis, we defined the levels of effects on economic conditions as follows:

**Negligible:** No changes would occur, or changes to socioeconomic indicators (changes in regional spending, income, and/or employment) would be below or at the level of about 3 percent. If detected, effects would be slight and short term.

**Minor:** The effect would be slight, but detectable, and would impose only minor increases or decreases to economic indicators, between 4 and 10 percent.

**Moderate:** The effect would be readily apparent and would impose increases or decreases in economic indicators between 11 and 25 percent.

**Major:** The effect would be severely adverse or beneficial changes in regional spending, income, and/or employment. These changes would be greater than 25 percent.

### 4.3.3 Incomplete or Unavailable Information

Adequate information is available to analyze effects on economics at the RMP level.

### 4.3.4 Analysis of the Preferred Alternative

Some of the proposed management actions would only slightly or not change regional economic activity. Small changes might result from one-time spending for labor, equipment, or supplies.

Fire and fuels management activities under the Preferred Alternative include prescribed fire, mechanical treatment, chemical treatment, and biological treatment. Up to 10,000 acres per year may be treated with mechanical methods. Table 4.3-1 summarizes the direct plus indirect and induced jobs that would result from annual mechanical treatment within the two-county economic study area. Mechanical treatment would generate approximately 69 new jobs in the study area. These new jobs would increase total personal income in the two-county economic study area by \$1,840,000.

Prescribed fire, chemical treatments, and biological treatments also are expected to benefit the local economy as a result of expenditures made for goods and services.

Vegetation management under the Preferred Alternative may include mechanical harvesting, prescribed burning, and manual harvesting. Approximately 5 miles of access roads would be constructed to facilitate the vegetation management activities. Mechanical harvesting, manual harvesting, and constructing roads would generate approximately two new jobs in the two-county study area (Table 4.3-1). The new jobs would increase total personal income in the two-county economic study area by \$63,100.

Conducting vegetation management activities using prescribed fire and manual harvesting also would benefit the local economy as a result of expenditures on equipment and supplies. Although beneficial, the total acreage treated is not expected to result in a substantial change in local economic activity.

Approximately 446,000 acres would be ‘Open’ to exploration and possible extraction of minerals and renewable energy sources under the Preferred Alternative. 470,052 acres would be ‘Open’ to locatable minerals. Of the 446,000 acres, approximately 435,000 acres would be ‘Open’ to exploration and possible extraction of flat rock. Although revenues associated with energy and minerals are not a substantial element of the local economy, allowing entry to extract minerals and encouraging development of renewable energy sources could benefit local economic activity.

Forestry management under the Preferred Alternative would include mechanical harvesting of timber from 600 acres/year, manual thinning 90 acres/year, and replanting 400 acres/year. These activities are expected to generate 14 new jobs in the two-county study area. The new jobs would increase total personal income by \$364,347. Timber harvesting is not expected to result in a substantial benefit to local economic activity.

Livestock grazing improvements would be implemented on an allotment basis, including changes in season of use, grazing periods, and exclusion of small areas containing unique resources. These changes would be localized and affect individual grazing permits. None of these changes would measurably change economic activity under the Preferred Alternative.

Up to 19,330 acres of land would be sold or transferred by BLM. Lands under federal ownership in Lassen and Modoc Counties totaled 1.6 million and 1.7 million acres, respectively. During fiscal year 2000–2001, in-lieu payments to Lassen and Modoc Counties were estimated to total \$996,000 and \$259,000, respectively (BLM 2004b, 2004c). The slight reduction in land held in federal ownership is not expected to substantially reduce the federal in-lieu payments received by the counties.

New recreation facilities proposed under the Preferred Alternative include 25 miles of new hiking trails. Coldwater and warmwater sport fisheries would be enhanced. OHV use would be more closely managed by restricting use to existing roads. Any reduction in OHV use opportunities as a result of this change in management is expected to be offset by establishing OHV management areas.

The economic effect of providing new campgrounds and trails and enhancing sport fisheries is expected to benefit the regional economy as a result of increased visitation and associated recreation-related expenditures on supplies and services. A substantial change in expenditures made by OHV users is not expected because these recreationists would be allowed on BLM roads and would be provided with three new OHV management areas.

Overall economic impact would be negligible.

### 4.3.5 Summary of Effects of the Preferred Alternative

Table 4.3-1 summarizes the combined effects on employment and income resulting from the management actions proposed under the Preferred Alternative. When combined, these actions are expected to generate approximately 85 new jobs and \$2.2 million in annual personal income. Although not quantified, the other management actions discussed above also would increase regional economic activity. Total employment within the two-county study area would increase by approximately 0.5%. Total personal income would increase by approximately 0.3%. The proposed management actions under the Preferred Alternative would result in a small increase in regional economic activity, and overall impacts would be minor.

The potential reduction of in-lieu payments to the counties as a result of the sale or transfer of federal lands in the AFO area would not be substantial, and losses in county revenues may be offset by a potential increase in property tax revenues.

#### **4.3.6 Cumulative Effects**

Table 4.3-2 summarizes the cumulative effects on employment and income under the Preferred Alternative when combined with the proposed management programs for the Surprise Field Office and Eagle Lake Field Office. When combined, management actions would result in an increase of 83 jobs and increase in personal income of approximately \$2.3 million. (Although not quantified, the other management actions discussed above also would increase regional economic activity.) This cumulative effect represents an increase in employment of approximately 0.03% and personal income of approximately 0.02% within the regional economic study area that encompasses all three field offices. Jobs and income generated by fire and fuels, vegetation, and forestry management actions occurring in each field office would be responsible for most of the change in economic activity.

#### **4.3.7 Mitigation Measures**

None.

#### **4.3.8 Unavoidable Adverse Impacts**

None.

#### **4.3.9 Short-Term Uses Versus Long-Term Productivity**

None.

#### **4.3.10 Irreversible and Irretrievable Impacts**

None.

**Table 4.3-1** Estimated Changes in Employment and Income from Management Actions in the Alturas Field Office Area

Alternative	Management Action	Direct Jobs	Direct Income (\$)	Indirect/Induced Jobs	Indirect/Induced Income (\$)	Total Jobs	Total Personal Income (\$)
No Action	Fire and fuels	0.4	\$12,029	0.3	\$6,371	0.7	\$18,400
	Vegetation	0.6	\$15,744	0.3	\$8,338	0.9	\$24,082
	Forestry	0.3	\$9,556	0.2	\$5,061	0.5	\$14,617
	Grazing	0	NA	0	NA	0	NA
	<b>Totals</b>	<b>1.3</b>	<b>\$37,329</b>	<b>0.8</b>	<b>\$19,770</b>	<b>2.1</b>	<b>\$57,099</b>
Alternative 1	Fire and fuels	100	\$ 2,622,000	75	\$1,978,000	175	\$4,600,000
	Vegetation	1.5	\$40,321	0.8	\$21,354	2.3	\$61,675
	Forestry	9	\$250,880	5.3	\$132,872	14.3	\$383,752
	Grazing	0	NA	0	NA	0	NA
	<b>Totals</b>	<b>110.5</b>	<b>\$2,913,201</b>	<b>81.1</b>	<b>\$2,132,226</b>	<b>191.6</b>	<b>\$5,045,427</b>
Alternative 2	Fire and fuels	21.7	\$601,459	12.7	\$318,549	34.4	\$920,008
	Vegetation	1.1	\$29,581	0.6	\$15,767	1.7	\$45,348
	Forestry	2.6	\$73,069	1.6	\$38,700	4.2	\$111,769
	Grazing	-183.1	(\$648,363)	-205	(\$2,285,652)	-388.1	(\$2,934,015)
	<b>Totals</b>	<b>-157.7</b>	<b>\$55,746</b>	<b>-190.1</b>	<b>(\$1,912,636)</b>	<b>-347.8</b>	<b>(\$1,856,890)</b>
Alternative 3	Fire and fuels	10.8	\$300,729	6.4	\$159,275	17.2	\$460,004
	Vegetation	0.3	\$4,461	0.2	\$2,362	0.5	\$6,823
	Forestry	4.2	\$116,209	2.4	\$61,547	6.6	\$177,756
	Grazing	0	NA	0	NA	0	NA
	<b>Totals</b>	<b>15.3</b>	<b>\$421,399</b>	<b>9</b>	<b>\$223,184</b>	<b>24.3</b>	<b>\$644,583</b>
Preferred	Fire and fuels	43.4	\$1,202,917	25.3	\$637,099	68.7	\$1,840,016
	Vegetation	1.5	\$41,273	0.9	\$21,860	2.4	\$63,133
	Forestry	8.5	\$238,194	5	\$126,153	13.5	\$364,347
	Grazing	0	NA	0	NA	0	NA
	<b>Totals</b>	<b>53.4</b>	<b>\$1,482,384</b>	<b>31.2</b>	<b>\$785,112</b>	<b>84.6</b>	<b>\$2,267,496</b>

Note: NA = Not applicable (because there is no change in jobs, there is no corresponding change in income). Source: IMPLAN 2004.

**Table 4.3-2** Cumulative Effects on Income and Employment in the Alturas Field Office Region

Field Office – Alternative	Management Action	Total Jobs	Total Personal Income (\$)
Alturas – Preferred Alternative	Fuels	34.4	\$1,840,016
	Vegetation	2.4	\$63,133
	Forestry	14.3	\$364,347
	Grazing	0	NA
	Totals	51.1	\$2,267,496
Alturas – Alternative 2	Fuels	34.4	\$920,008
	Vegetation	1.7	\$45,348
	Forestry	4.2	\$111,769
	Grazing	-388.1	(\$2,934,015)
	Totals	-347.8	(\$1,856,890)
Eagle Lake – Preferred Alternative	Fuels	0	NA
	Vegetation	0	NA
	Forestry	6.2	\$199,932
	Grazing	0	NA
	Totals	6.2	\$199,932
Surprise – Preferred Alternative	Fuels	17.7	\$507,031
	Vegetation	7.6	\$217,239
	Forestry	0.5	\$15,207
	Grazing	0	NA
	Totals	25.8	\$739,477

Notes: NA = Not applicable (because there is no change in jobs, there is no corresponding change in income).

Total regional cumulative effects would be the sum of either Alternative 2 or the Preferred Alternative for the AFO and the totals for the Surprise and Eagle Lake Field Offices.

Source: IMPLAN 2004.

## 4.4 Potential Effects on Energy and Minerals

This section discusses direct, indirect, and cumulative effects on energy and mineral development as a result of implementing proposed management actions under the Preferred Alternative. Current potential for energy and mineral development is very low, as described in the Reasonably Foreseeable Development Scenario, Appendix D. However, there are potential conflicts between objectives for energy and mineral resource development and those for physical, biological, and cultural resource management. These conflicts would be resolved through mitigation measures, withdrawal of land from mineral entry, or through designating certain parcels unavailable for mineral development. Mitigation measures would be incorporated as terms, conditions, and stipulations in permits and leases.

### 4.4.1 Methodology and Assumptions

Effects on energy and mineral development are considered *adverse* if they restrict or create higher costs for exploration, development, and/or extraction of these resources. Effects are considered *beneficial* if they increase access to these resources.

Effects on energy and mineral development are considered beneficial if more land is opened to development and fewer restrictions applied. Proposed actions were considered less beneficial if more land is closed to development or more restrictions applied.

### 4.4.2 Incomplete or Unavailable Information

There is limited information on the location and extent of mineral resources in the AFO management area. Consequently, the first step in mineral and energy development is usually exploratory, to determine the extent and economic feasibility of mineral resource extraction. Until a potential permittee or lessee approaches BLM with an application or plan of operations, the location and extent of potential development activities are unknown. For this reason, the planning approach for energy and mineral management is to identify where these activities may conflict with the management of other resources and examine possibilities for mitigating conflicts or withdrawing lands from mineral entry.

### 4.4.3 Analysis

For the purpose of this analysis, effects on energy and mineral development are defined as follows:

**Negligible:** Effects would be barely detectable; would not cause additional restrictions beyond standard leasing terms or add higher costs to exploration, development, and/or extraction of resources. The amount of land available for energy and mineral development without restrictions would be maximized.

**Minor:** Effects would be slight, but detectable, and would cause minor restrictions or add slightly higher costs to the exploration, development, and/or extraction of resources. The amount of land available for energy and mineral development would be slightly lower (up to 25% for a adverse impact) than the present situation, or slightly higher (up to 25% for a beneficial impact).

**Moderate:** Effects would be readily apparent and would cause moderate restrictions or moderately higher costs to the exploration, development, and/or extraction of resources. The amount of land available for energy and mineral development would be moderately lower (26-50% for a adverse impact) than the present situation, or moderately higher (26-50% for a beneficial impact).



**Major:** Effects would be very large and would cause substantially more restrictions and/or add substantially higher costs to the exploration, development, and/or extraction of resources. The amount of land available for energy and mineral development would be substantially lower (>50% for a adverse impact) than the present situation, or substantially higher (>50% for a beneficial impact).

### 4.4.4 Impacts Common to All Energy and Minerals

Wilderness study areas (WSAs) (56,648 acres) would remain ‘Closed’ to mineral leasing, saleable mineral activities, and renewable energy development pending Congressional action on their wilderness status (H-8550-1, Interim Management Policy for Lands under Wilderness Review, 1995).

WSAs are ‘Open’ to exploration and development of locatable minerals. However, use is limited to activities that do not require reclamation unless the operation had established ‘grandfathered’ uses or valid existing rights on or prior to October 21, 1976 (H-8550-1, Interim Management Policy for Lands under Wilderness Review, 1995).

The AFO Interim Flat Rock Policy (Appendix M) would remain in effect.

Lands and realty actions may also create access to public lands that were previously inaccessible, opening lands to locatable mineral development without the need for new road construction.

Acquired lands would be managed according to the purpose of acquisition or by management practices on adjacent lands. For instance, 640 acres of mining mitigation lands in Section 2, T36N R9E (to be acquired from Lassen Gold), would be recommended for mineral withdrawal.

Exploration, development, and extraction of energy and minerals in areas with cultural resources or tribal interests, may be subject to mitigation or avoidance measures that may adversely affect users. User operations may be restricted by specific terms, conditions, or stipulations.

Projects would be planned to preserve the assigned visual resource management (VRM) designation.

### 4.4.5 Leasable Mineral Resources

Lands available for leasable mineral extraction would fall into one of three categories of conditions for mineral leasing. The least restrictive are lands ‘Open’ for leasing under standard leasing terms. The most restrictive are lands ‘Open’ for leasing with a ‘no surface occupancy’ (NSO) requirement. In some areas, restrictions beyond the standard leasing terms may be implemented in order to protect sensitive resources. In this section, additional restrictions are referred to as ‘surface use and occupancy requirements.’ These are detailed in Appendix K. Also for the purpose of this section, the following things are (broadly) referred to as “sensitive resources.”

- Wildlife habitats
- Raptor nests
- Slopes and fragile soils
- BLM-sensitive plants
- Streams, rivers, and floodplains
- Playas and alkali lakes
- Seeps, springs, lakes, and reservoirs
- Caves

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- Sage-grouse
- Visual resources
- Recreation sites

### 4.4.5.1 Analysis of the Preferred Alternative

The Preferred Alternative emphasizes resource management through commodity production combined with mitigation and resource protection. Under this alternative, 445,997 acres (89%) of BLM-administered lands would be available for mineral leasing under standard leasing terms, and adverse impacts would be minor.

Seasonal restrictions to protect wildlife would affect 10,612 acres (2%).

Approximately 200,000 acres (39%) would be subject to surface use and occupancy requirements.

NSO would apply to the acres within ACECs:

Ash Valley ACEC	1,322
(Proposed) Emigrant Trails ACEC(portion outside WSA)	750
(Proposed) Mountain Peaks ACEC (portion outside WSA)	2,515
(Proposed) Old Growth Juniper ACEC	3,115
(Proposed) Mt. Dome ACEC	1,510
(Proposed) Likely Tablelands/Yankee Jim/Fitzhugh Creek ACEC	1,400

Lands within WSAs and the Lower Pit River Wild and Scenic River (WSR) corridor (400 acres) would be 'Closed' to leasing (57,048 acres or 11%.)

Mineral leasing on an additional 2,950 acres proposed for enclosure fencing could be more complicated.

Construction of interpretive sites and camping areas could impact the availability of several hundred acres of public land for mineral leasing.

Proposals to build up to 60 miles of new temporary and permanent roads could facilitate mineral development.

A combined impact to leasable energy and mineral exploration, development, and extraction is expected to be adverse but minor. While 89% of the management area would be 'Open' to leasing, 42% of this area would be subject to surface use and occupancy requirements or to a NSO requirement. This would be expected to increase the cost of mineral or energy development.

### 4.4.5.2 Cumulative Effects

The area of analysis for cumulative impacts on leasable minerals is the AFO boundary border. Based on a history of minimal interest in oil and gas exploration and the limited development potential of the planning area, activity over the next 15 to 20 years is likely to be small and sporadic. Oil and gas activity will probably consist of issuing some competitive and over-the-counter leases, a few geophysical surveys, and perhaps the drilling of two or three exploratory wells.

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Total surface disturbance caused by exploratory drilling over the life of this plan is expected to be about 13 acres.

Any oil and gas deposits that may be found will probably be too small for economical development. However, if development were to occur, the total surface disturbance caused by exploration and development would probably affect about 800 acres.

Geothermal energy resources are known to exist in this region but are essentially undeveloped--particularly in the AFO planning area. With recent interest in geothermal energy expressed by some governmental and private entities, geothermal exploration may be initiated in the planning area which could lead to development of this resource. However, the small and relatively isolated population of the area means direct use of geothermal energy from public lands is unlikely.

Based on the history of geothermal exploration in California and Nevada and a projected increase in demand, about six notices of intent for surface geophysical surveys and five notices of intent to drill 30 temperature gradient holes are expected to be filed during the life of this PRMP. Total surface disturbance as a result of geophysical surveys is expected to be about 0.5 acre over the life of this plan. About 5.5 acres of surface disturbance is expected for temperature gradient holes. It is estimated that eight exploratory wells would be drilled during the life of this plan, resulting in a grand total of 34 acres for surface disturbance over the life of this PRMP. A geothermal generating facility (if constructed) would have a total surface disturbance of 25 to 75 acres.

The most favorable conditions for exploration and development of mineral resources would be with the fewest restrictions possible. Individuals and companies involved in exploration and development face numerous environmental obligations in order to comply with standard leasing requirements and terms of sale. Additional measures for mitigation of disturbance to lands and (other) resources result in further impacts and additional costs for mineral exploration and development. NSO stipulations are most appropriate for small areas where directional drilling is feasible (up to 0.5 miles).

Within the area of evaluation for cumulative effects, there are several owners, including BLM, that require lands be 'Closed' to mineral operations. These include wildlife refuges, one national monument, wilderness study areas, and other special management areas. Although the cumulative area of lands 'Closed' to mineral leasing is fairly substantial, impacts are felt to be minor due to low expectation of industry proposals for exploration and development.

Potential development of energy and mineral resources on lands outside BLM jurisdiction are not expected to be significantly affected by management actions, and no cumulative impacts are anticipated.

### **4.4.5.3 Mitigation Measures**

No proposed actions would result in substantial decrease of area available for energy and mineral development. No actions would result in impacts that would necessitate mitigation of oil, gas, and mineral resources; therefore, mitigation measures would not be necessary.

### **4.4.5.4 Unavoidable Adverse Impacts**

None.

#### **4.4.5.5 Short-Term Uses Versus Long-Term Productivity**

If and when fossil fuel and mineral resources are extracted and short-term beneficial uses (e.g., increased supply of minerals to meet demand, decreased production costs, increased royalties) are realized, these resources would no longer be available for long-term or future production.

#### **4.4.5.6 Irreversible and Irretrievable Impacts**

Extraction and development of leasable mineral resources will result in loss of those minerals due to the finite nature of the resource.

#### **4.4.6 Locatable Mineral Resources**

Public lands are identified as ‘Open’ or ‘Closed’ to locatable mineral development. Closed areas are said to be ‘withdrawn’ from mineral entry.

Locatable mining operations on lands ‘Open’ to mineral entry—as well as on claims that predate withdrawal—must be conducted in compliance with 43 CFR 3809 (surface management) regulations. These regulations require an operator to prevent unnecessary or undue degradation of the land. Five acres or less of surface disturbance usually requires a notice. The notice must describe proposed activities, the location on the ground, the start-up date, road access and construction (if any), and reclamation measures. Receipt and review of a notice is not a federal action, therefore; there is no requirement for the preparation of an environmental assessment (EA) or environmental impact statement (EIS). Approval by BLM is not required for a notice.

A plan of operation must document in detail all actions that the operator plans to take from exploration through reclamation. The plan of operations must include a description of proposed activities, road access and construction, reclamation measures, timeframes for non-operation, and a sketch or a map of the area of disturbance, including all access routes. An EA or an EIS must be prepared by BLM or the claimant/operator prior to commencement of any surface-disturbing activities. A plan of operations must be approved by BLM and operations may not commence until the plan is approved.

Special category lands, as defined in 43 CFR 3809.1-4, require a plan of operations. A plan of operation must be filed for operations within the National Wild and Scenic River System (and areas nominated for addition to the system), (designated) ACECs, areas ‘Closed’ to OHVs (as defined in 43 CFR 8340-5), and any lands or waters known to contain federally listed (or proposed) threatened or endangered species, or their designated (or proposed) critical habitats.

Filing plans of operation is generally more laborious than notice-level operations, and the cost of extracting locatable minerals would generally be greater. Given the moderate potential for economically viable occurrences of locatable minerals within the planning area plus the fact that limited development activity is anticipated for the next 15 years, requirements for plans of operation would not be likely to result in increased costs to most mining operators.

In order to protect sensitive resources, additional restrictions may be placed on plans of operation. These additional restrictions are referred to as ‘surface use and occupancy requirements,’ and were listed previously in the leasable minerals section and detailed in Appendix K.

### 4.4.6.1 Analysis of the Preferred Alternative

The Preferred Alternative emphasizes resource management emphasizing commodity production combined with mitigation and protection measures for resource protection. Under this alternative, 470,052 acres (93%) of the management area would be 'Open' to locatable mineral development, and adverse impacts would be minor.

Lands within proposed ACECs (32,993 acres or 7%) would be recommended for withdrawal from mineral entry.

Surface use and occupancy requirements would apply to plans of operation on approximately 200,000 acres. The effect of sensitive resource restrictions on locatable minerals development is expected to be minor. The total surface area of restrictions applied during the specific environmental assessment would be relatively low and required mitigation measures would result in minor changes to operations, such as ensuring that structures do not provide perches for raptors, selecting alternative access routes to avoid critical habitats, adjusting equipment locations, and other site-specific mitigation measures.

Locatable mineral operations generally require roads and other conveyance systems; therefore, existing or proposed systems would generally be advantageous to mineral operations, providing use is not restricted. The Preferred Alternative promotes construction of new permanent roads for other resource purposes. Utilization of existing permanent and temporary roads would result in lower road-building and maintenance costs. To be more specific, this alternative supports construction of 10 miles of new permanent roads to support forestry and juniper-reduction work which—if geographically appropriate—can be used for locatable mineral development without the added cost of road construction.

Most of the management area would be open to new utility corridor development under this alternative. The total beneficial effect on locatable mineral development from new utility corridor development is expected to be slight because of the small amount of land affected by these actions. However, actual utility development can be beneficial for mineral development by providing a nearby energy source.

The combined impact on locatable mineral exploration, development, and extraction is expected to be adverse but minor due to some small land closures and surface use and occupancy requirements.

### 4.4.6.2 Cumulative Effects

The area of analysis for cumulative impacts on locatable minerals is the AFO boundary. Based on a history of minimal interest in locatable mineral exploration and the limited development potential of the planning area, activity over the next 15 to 20 years is likely to be small and sporadic.

Locatable mineral activity would probably consist of maintaining current claims, a small number of new claims would be staked, and some non-invasive geophysical, geochemical, and geological drilling involving a small number of exploratory holes. Total surface disturbance caused by exploratory drilling over the life of this plan is expected to be about 300 acres. Any locatable mineral deposits that may be found will probably be too small or of such low-grade as to make development unprofitable. However, if development were to occur, the total surface disturbance caused by exploration and development would probably affect about 1000 acres.

The most favorable conditions for exploration and development of mineral resources would be with the fewest restrictions possible. Individuals and companies involved in exploration and development face numerous environmental obligations in order to comply with NEPA plus state and federal regulations.

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Additional measures for mitigation of disturbance to lands and (other) resources result in further impacts and additional costs for mineral exploration and development.

Within the area evaluated for cumulative effects, WSAs would close an additional 56,648 acres. Although the cumulative area of lands ‘Closed’ to locatable mineral development is fairly substantial, impacts are felt to be minor due to low expectation of industry proposals for exploration and development.

Potential development of energy and mineral resources on lands outside BLM jurisdiction are not expected to be significantly affected and no cumulative impacts are anticipated.

### **4.4.6.3 Mitigation Measures**

No proposed actions would result in substantial decrease of area available for locatable mineral development. No actions would result in impacts that would necessitate mitigation of locatable mineral resources; therefore, mitigation measures would not be necessary.

### **4.4.6.4 Unavoidable Adverse Impacts**

None.

### **4.4.6.5 Short-Term Uses Versus Long-Term Productivity**

If and when locatable mineral resources are extracted and short-term beneficial uses (e.g., increased supply of minerals to meet demand, decreased production costs, increased commodity prices) are realized, these resources would no longer be available for long-term or future production.

### **4.4.6.6 Irreversible and Irretrievable Impacts**

Extraction and development of locatable mineral resources will result in loss of those minerals due to the finite nature of the resource.

### **4.4.7 Saleable Mineral Resources**

Public lands are designated ‘Open’ or ‘Closed’ based on the type of saleable mineral involved. Mineral materials include cinders and sand, these are removed from open pits. Decorative stone or flatrock is used in construction and landscaping or by Native Americans for ceremonial purposes. These materials are removed from the ground surface.

In order to protect ‘sensitive resources,’ additional restrictions may be placed on plans of operation. These additional restrictions are referred to as ‘surface use and occupancy requirements,’ and were listed previously in the leasable minerals section and detailed in Appendix K.

#### **4.4.7.1 Analysis of the Preferred Alternative**

The Preferred Alternative emphasizes resource management by balancing commodity production with resource protection; 435,385 acres (86%) of BLM-administered lands would be available for extraction of saleable minerals, and adverse impacts would be minor.

Surface use and occupancy requirements would apply to approximately 200,000 acres.

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The AFO Flat Rock Policy would remain in effect.

Access to saleable minerals on an additional 2,950 acres proposed for enclosure fencing would be problematic.

Construction of interpretive sites and camping areas could impact availability of saleable minerals on several hundred acres of public land.

Proposals to build as much as 10 miles of permanent roads could open more areas to mineral exploration, resulting in minor beneficial impacts.

A combined impact on saleable mineral exploration, development, and extraction is expected to be adverse but minor due to surface use and occupancy requirements.

A minor beneficial effect may accrue from new road construction.

The Preferred Alternative would leave 86-87% of the management area 'Open' to saleable mineral development; however, surface use and occupancy requirements would apply on approximately 200,000 acres. The Preferred Alternative is expected to meet all demands for saleable minerals within the AFO management area.

### **4.4.7.2 Cumulative Effects**

The area of analysis for cumulative impacts on saleable minerals is the AFO boundary. Based on the history of saleable mineral development within the planning area, the next 15 to 20 years is likely to see a further increase in saleable mineral development. As development continues on private lands in and around the AFO boundary, nearby sources of saleable minerals will be depleted. This will increase pressure for low-cost public land sources. Saleable mineral activities would most likely consist of maintaining existing roadways and sales to individuals and companies. Most new sales to individuals are expected to involve less than 10 acres.

The most favorable conditions for exploration and development of saleable mineral resources would be with the fewest restrictions possible. Individuals and companies involved in development face numerous environmental obligations in order to comply with NEPA plus state and federal regulations. Additional measures for mitigation of disturbance to lands and (other) resources would result in further impacts and additional costs for saleable mineral development.

Development of saleable mineral resources on lands outside BLM jurisdiction are not expected to be significantly affected and no cumulative impacts are anticipated.

### **4.4.7.3 Mitigation Measures**

None.

### **4.4.7.4 Unavoidable Adverse Impacts**

None.

#### **4.4.7.5 Short-Term Uses Versus Long-Term Productivity**

If and when saleable mineral resources are extracted and short-term beneficial uses (e.g., increased supply of minerals to meet demand, decreased production costs, increased commodity prices) are realized, these resources would no longer be available for long-term or future production.

#### **4.4.7.6 Irreversible and Irretrievable Impacts**

Extraction and development of saleable mineral resources will result in loss of those minerals due to the finite nature of the resource.

#### **4.4.8 Renewable Energy**

The National Energy Policy calls for an increase in renewable energy production on federal lands. Typical development would involve wind, solar, hydroelectric, and biomass infrastructure. Public lands are designated ‘Open’ or ‘Closed’ to renewable energy development. Renewable energy development would be conducted under permit and subject to specified terms and conditions. In order to protect ‘sensitive resources,’ additional restrictions may be placed on plans of operation. These additional restrictions are referred to as ‘surface use and occupancy requirements,’ and were listed previously in the leasable minerals section and detailed in Appendix K.

##### **4.4.8.1 Analysis of the Preferred Alternative**

The Preferred Alternative emphasizes resource management by balancing commodity production with resource protection. Under this alternative, 435,385 acres (83%) of BLM-administered lands would be available for renewable energy development, and adverse impacts would be minor to moderate. Lands within WSAs and the Lower Pit River WSR corridor would be ‘Closed’ to renewable energy development (57,048 acres or 11% of the AFO management area). Six ACECs (29,171 acres or 6%) would be ROW exclusion areas.

Surface use and occupancy requirements would apply to approximately 200,000 acres. Access to an additional 2,950 acres proposed for exclosure would be problematic.

Specific renewable energy project proposals will be considered through the ROW authorization process, in accordance with Federal Land Policy and Management Act (FLPMA), regulations, and BLM policy. Wind energy projects will be designed and developed in accordance with the Final Programmatic EIS on Wind Energy Development on BLM-Administered Lands in the Western United States, 2005 and a project/site-specific NEPA review. Implementation of any proposed management actions would ensure that potential adverse impacts to most of the natural resources present at wind energy development sites would be minimal to negligible.

Construction of interpretive sites and camping areas could impact the development of renewable resources on several hundred acres of public land. Proposals to build as much as 10 miles of permanent roads could open more areas to renewable energy development.

Approximately 31% of the field office area would be managed as VRM Class II, and approximately 21% would be designated as VRM Class III (see Map VRM-1). Class I designations apply only to WSAs (11%), and change of the WSA status would require an action by Congress. As described in Section 2.20 Visual Resources, natural settings would be significantly changed with development of wind energy farms, which would create strong visual contrasts in areas where wind turbines up to 200 feet high, transmission lines, and service roads would be located.



Approximately 37% of the field office area would be managed as VRM Class IV. The lands that would be managed under VRM Class IV criteria (major modification of the existing landscape) would permit new developments that could greatly alter the existing landscape.

The Preferred Alternative is expected to have minor to moderate site-specific adverse effects on renewable energy development, primarily because 17% of the field office would be excluded or avoided for new development. In addition, 63% of the field office would be managed to meet VRM Class I, II and III objectives. Minor beneficial effects may accrue from realty actions and new road construction.

A number of areas potentially suitable for wind energy development are identified in this PRMP as VRM Class II (see Chapter 2.20). BLM recognizes that wind energy development would likely be inconsistent with this VRM classification. An analysis to reconsider VRM classes for potential wind energy locations is being deferred until specific projects are proposed and a reasonably foreseeable development scenario is completed. This analysis will assess both site-specific and cumulative visual impacts, and will include visual simulations to illustrate these impacts from key observation points, such as communities and trail corridors.

### **4.4.8.2 Cumulative Effects**

The area of analysis for cumulative impacts on renewable energy development is the AFO boundary. Based on the history of renewable energy development and proposals within the planning area, the next 15 to 20 years is likely to see a moderate increase in renewable energy development. As technologies continue to develop, portable electrical generating plants based on biomass fuels are a possibility for the AFO management area.

The most favorable conditions for development of renewable energy infrastructure would be with the fewest restrictions possible. Individuals, government entities, and private companies involved in development face numerous environmental obligations in order to comply with NEPA plus state and federal regulations.

Additional measures for mitigation of disturbance to lands and (other) resources would result in further impacts and additional costs for renewable energy development.

Development of renewable energy resources on lands outside BLM jurisdiction are not expected to be significantly affected, and no cumulative impacts are anticipated.

### **4.4.8.3 Mitigation Measures**

None.

### **4.4.8.4 Unavoidable Adverse Impacts**

None.

### **4.4.8.5 Short-Term Uses Versus Long-Term Productivity**

None.

### **4.4.8.6 Irreversible and Irretrievable Impacts**

None.

## **4.5 Potential Effects on Environmental Justice**

This section describes the potential impacts on environmental justice as a result of implementing proposed management actions under the Preferred Alternative. The PRMP planning process incorporated environmental justice considerations to meet federal law requirements by addressing any adverse human health or environmental impacts that might affect minority or low-income populations to a greater extent than the general population in the areas. The only environmental justice population in the AFO area is the Native American community.

Most management actions would not affect this population. Proposed management activities with the greatest potential to affect environmental justice issues in the field office area relate to cultural resources, fire and fuels, visual resources, and energy and minerals. Although potential effects exist, their impacts would be minor and are not expected to disproportionately affect environmental justice populations. Where potential adverse effects have been recognized, measures to avoid or reduce these effects have been recommended.

### **4.5.1 Methodology and Assumptions**

No assumptions were made in the analysis of environmental justice effects.

### **4.5.2 Incomplete or Unavailable Information**

Adequate information is available to analyze the effects on environmental justice at the RMP level.

### **4.5.3 Analysis of the Preferred Alternative**

Impacts to environmental justice communities from proposed management actions under the Preferred Alternative would be negligible to minor, and are not expected to be significant.

No effects related to environmental justice are expected from management actions for the following:

- air resources,
- soil resources,
- terrestrial and aquatic wildlife,
- vegetation,
- water resources,
- wild horses and burros,
- forestry,
- grazing,
- lands and realty,
- recreation,
- special management areas, or
- utilities, transportation, and telecommunications.

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Any action that would bring the public closer to TCPs (e.g., building interpretive sites) could adversely affect Native Americans. Such actions should be implemented in close consultation with Native American communities. Fencing cultural resources that would restrict access to Native Americans is considered an adverse effect.

The fencing of cultural resource sites to the general population (while allowing Native Americans occasional access), is considered a beneficial effect, because sacred sites, TCPs, and other resources would be protected.

Increases in particulates in the air from prescribed burning and AMR would lower air quality during the summer fire season and periods when prescribed burns could be implemented. These short-term reductions in air quality would affect all populations in the field office area to the same degree. Because wildland-urban interface (WUI) areas are prioritized for fuel treatment, it would be beneficial to consult tribes when defining WUI areas on or near tribal lands.

Management actions resulting in aesthetic changes (e.g., fencing) on public lands that are near tribal lands might adversely affect Native Americans. Consultation with tribal groups on proposed projects close to sacred sites with high-value visual resources would avoid potential use conflicts.

### **4.5.4 Cumulative Effects**

There are no anticipated cumulative effects of the proposed management actions on environmental justice communities.

### **4.5.5 Mitigation Measures**

None.

### **4.5.6 Unavoidable Adverse Impacts**

None.

### **4.5.7 Short-Term Uses Versus Long-Term Productivity**

None.

### **4.5.8 Irreversible and Irretrievable Impacts**

None.

## 4.6 Potential Effects on Fire and Fuels

This section describes the potential impacts on fire and fuels as a result of implementing proposed management actions under the Preferred Alternative.

### 4.6.1 Methodology and Assumptions

The following assumptions were used in assessing impacts of management actions of resource programs on fire and fuels.

- Increased population density and increased use of public land would positively correlate with an increase in the potential for human-caused ignitions.
- Natural ignitions (lightning strikes) and weather events affecting fire behavior (e.g., wind, precipitation, and relative humidity) are random events. Therefore, the amount of land that would burn annually as a result of wildfire cannot be predicted.
- Effects on the fire management program are considered to be those actions that would increase or decrease the costs of the fire suppression program. Later rehabilitation costs would be lower in healthy plant communities.
- AMR includes the full range of suppression options but allows for some reduced cost and effort based on conditions affecting fire spread. AMR can reduce the cost of suppression over a longer time frame.
- Actions that would increase the potential for fire ignitions, increase fire size or intensity, or hinder suppression by limiting access or suppression actions were considered *adverse* effects. Likewise, actions that would facilitate the return of communities to their natural fire regime with vegetation composition structure and composition intact (i.e., Condition Class 1) were considered *beneficial*.
- Actions that would decrease potential for fire ignitions, decrease fire size or intensity, or improve suppression capability through improved access were considered *beneficial* effects. Actions that would cause further departure of plant communities from their natural fire regime and degradation of communities in composition, structure, and diversity (e.g., Condition Class 2 and 3) were considered to cause *adverse* effects.
- Impacts of AMR would be equivalent to a full suppression strategy in as many as 90-95% of the fires that occur during the normal fire season when conditions are favorable for the rapid spread of wildfires.
- When a target number of acres were noted in the alternative description, the acreage was assumed to be a target to be achieved in the life of the RMP (20 years), rather than on an annual basis.
- Areas treated for juniper removal with less than 60% cover would contain perennials in the understory and therefore would respond more favorably to reduction treatments (including prescribed fire) than those with a denser canopy and negligible understory (Tausch 2004). Prescribed fire may not be as effective at removing large woody material, and stands may need to be treated several times to achieve the desired results.
- Post-fire restoration and rehabilitation efforts would be commensurate with pre-fire vegetation on site and associated condition class (e.g., Condition Class 3 degraded Wyoming sagebrush communities converted to cheatgrass or medusahead would require a more active rehabilitation understory, which may require only passive restoration.

#### 4.6.2 Incomplete or Unavailable Information

In the absence of pre-European-settlement vegetation maps, information on the soils, climate, and topography of an area can be used to predict potential natural vegetation (PNV). PNV groups represent the stable vegetation types that would become established on an ecological site if all successional stages were completed without human interference under present environmental conditions. In the absence of these data, the departure of current vegetation from historical composition, structure, and fire regime (i.e., condition class) was based on current vegetation and extrapolated information from personal observation and historical photos.

The boundaries of the WUI in the field office have not been delineated. Therefore, the acreage and vegetation types that would be affected by WUI-prioritized treatments were not analyzed.

#### 4.6.3 Analysis

This analysis defined the levels of effects on energy and mineral management as follows:

**Negligible:** No changes would occur to the risk of human-caused ignitions, vegetation fire regimes, or fire suppression costs. Or changes would be at or below the level of detection, and, if detected, the effects would be considered slight.

**Minor:** Changes to the risk of human-caused ignitions, vegetation fire regimes, or fire suppression costs would be measurable but small and local.

**Moderate:** Changes in the risk of human-caused ignitions, vegetation fire regimes, or fire suppression costs would be measurable and would have appreciable consequences, although the effect would be relatively local.

**Major:** Substantial changes would occur to the risk of human-caused ignitions, vegetation fire regimes, or fire suppression costs. These changes would be measurable, would have substantial consequences, and would be noticed

#### 4.6.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse impacts and moderate to major beneficial effects to fire and fuels management. Wildland fires that burn within or threaten the WUI or areas with significant resources would be given the highest priority for suppression. These actions alone would permit fuels to continue to accumulate in these areas. To reduce the threat of wildfires, these fuels would be treated. The primary goal of the fuels reduction treatment in these areas would be to reduce the threat of catastrophic wildfires. In some instances, meeting this goal would require that the plant community be altered to a condition not consistent with historic fire regimes.

Fire and fuels management actions are concerned with fuels reduction programs and the decisions of how, when, and where to suppress wildfires. Full suppression of fires reduces the frequency of medium-sized fires and results in increased fuels buildup over the long term. Over time, this buildup of fuels contributes to an increase in frequency of large, intense wildfires, which result in adverse effects to soil and water quality, aquatic habitats, and noxious weed invasion, among others.

AMR, including WFU, reduces fuel loadings over time to eventually return to natural fire regimes and Condition Class 1. These effects would be gradual and would increase over time as more areas are treated and lower intensity fires occur.

Over time, one would expect increases in vegetation diversity and range productivity and reductions in the potential for large, intense, damaging fires. AMR in as many as 90 to 95% of the fires during the normal fire season would be equivalent to a full suppression strategy. Therefore, many of the effects described for full suppression would also apply to most AMR fires.

If a fire starts in a WFU area and the conditions meet the prescription in the WFU burn plan (i.e., risk of the fire spreading out of control is very low), the fire can burn with only a minimal incident response (as outlined in the burn plan). The effect would be to reduce the cost of suppression, improve and maintain fire-adapted ecosystems, and reduce the size and intensity of future fires by reducing fuel loads. Burn acreage and smoke would likely increase from what they would be under a full-suppression response.

Fuels reduction treatments would reduce hazardous fuels, particularly in the WUI, making these areas safer for residents. Costs of fire suppression in these areas would decrease over time, as the probability of large, stand-replacing fires would decline in response to reduced hazardous fuels. Over the long term, the combination of fuels reduction, including prescribed burning and fire management, would facilitate the return of natural fire regimes and would increase the structural and biotic diversity of plant communities. Most fuels reduction would target juniper. Because dense stands of juniper are somewhat fire resistant, restoring these stands might actually convert the landscape to plant communities with more frequent fire intervals. The costs of rehabilitation would decrease over time because fires would be smaller and rehabilitation costs lower in healthy plant communities.

Post-fire rehabilitation actions, focused on restoring native plant communities over the long term, would increase diverse plant communities that have fire regimes within historical ranges (Condition Class 1). Risk mitigation and education programs could contribute to decreased fuel loading in residential areas as communities become more aware of the natural role of fire in ecosystems and their role as residents in creating defensible space.

The fire and fuels program could be adversely affected by potential actions to stabilize upland soils not meeting land health standards and to meet riparian and water quality standards, including building livestock exclosures and closing roads. Excluding livestock from areas could result in buildup of fine fuels in exclosures. However, because these actions would affect only a small area, adverse effects to fire and fuels management would be negligible to minor.

Management actions to improve habitat, including the use of prescribed fire, fuels reduction in bald eagle nest stands, and juniper removal, would be coordinated with the vegetation and fire and fuels programs. Habitat improvements designed to restore and rehabilitate native plant communities would result in more diverse and resilient plant communities on the landscape. Habitat improvement efforts would also bring plant communities closer to conditions where a historical fire regime would be expected. Using green stripping to protect priority habitat areas would aid in fire suppression by providing natural firebreaks.

Vegetation management actions would mainly benefit the fire and fuels program. Beneficial effects are expected from decreasing fuel loading across the landscape, particularly through the juniper reduction program and efforts to restore riparian, aspen, mountain mahogany, and oak communities. Fuels reductions would lead to decreased fire size, intensity, and rate of spread. In addition, vegetation management actions would restore more diverse vegetation community types and seral stages to the landscape. A diverse mosaic of vegetation types and stages creates a less homogenous landscape and slows the spread of fires.

For many vegetation communities, the proposed actions (whether mechanical, biological, chemical, or prescribed fire) to improve ecosystem health are designed to restore the community to a more natural ecosystem—effectively taking communities with a Condition Class rating of 2 or 3 and restoring them to a Condition Class 1 or 2. Adverse effects include an increased chance of human-caused ignition during these actions and risk that prescribed fire will escape.

Livestock grazing can decrease the fine fuels across a large area, which has the benefit of limiting fire spread. Reduced fine fuels can make carrying a prescribed fire difficult or can result in a burn needing to be conducted at the extreme of the prescription to achieve desired results. Therefore, where fire might be used as an ecosystem restoration technique and fire is desirable, grazing can adversely affect the use of prescribed fire or allowable wildland fire. In addition, if the fine fuel load cannot carry a fire, fire-intolerant juniper can become established and out-compete fire-tolerant grasses and forbs.

Management actions for wild horses and burros would affect fine fuels in much the same way as livestock grazing. Reduced wild horse and burro numbers to meet appropriate management levels (AMLs) would increase fine fuel loads in these areas and could increase fire spread and frequency in herd management areas (HMAs).

Management actions for energy and minerals can adversely affect fire management by encouraging infrastructure that could pose fire risk and result in added protection needs. In addition, the potential for increased visitation would increase the potential for human-caused ignition. Creating a new road would provide more access for human-caused ignitions as well as increased access for fire suppression. Roads can also act as a fuel break and can be effective in containing fire in certain fuel types. On the basis of current energy and mineral uses and trends, these effects would be negligible to minor in the field office area.

Forestry management actions to reduce fuel hazards in commercial and low-site forests would result in moderate beneficial effects by doing the following:

- improving forest health,
- increasing resistance to wildfire,
- reducing the potential for catastrophic wildfire, and
- increasing fire safety in WUI areas.

Mechanical treatments to reduce canopy fuels, in addition to hand treatments to reduce ladder fuels, would result in greater benefits to the fire and fuels program.

Recreation management actions have beneficial and adverse effects. Although creating more opportunities for recreation would increase human density and therefore the potential for human-caused ignitions, some actions that would increase human use would benefit fire and fuels. Creating a new road would provide more access for recreational users and provide increased access for fire suppression. Roads can also act as fuel breaks and can contain certain fuel types. New developments, such as campgrounds or interpretive sites, can affect suppression efforts by creating priority protection areas, but they also can provide beneficial resources—such as water sources, fuels alteration, and safety areas. Limiting OHV use to existing roads would reduce the opportunity for human-caused ignitions in these remote areas.

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The Preferred Alternative would avoid the use of heavy equipment and require special authorization in the following areas:

- ACECs,
- NRHP-eligible sites,
- WSAs, and
- other sensitive areas.

If used, heavy equipment would be restricted to existing roads and trails.

Retardant could be used in these areas for initial attack. Retardant use during extended attack would be considered a part of the wildland fire situation analysis, considering the resources at risk and public and firefighter safety. Limiting the use of retardants can hinder suppression efforts, causing fire in these restricted areas to grow larger. Nevertheless, the cost of controlling the fire may not be affected because suppression techniques would not include heavy equipment and would need to rely on indirect methods and natural barriers. In addition, restoration may be less costly without the need to restore areas disturbed by heavy equipment.

Restricting the fire management response allowed in ACECs would be commensurate with the level of protection required to preserve the special values in these areas. The effects on the fire and fuels program in these areas would be a function of response method as described under the effects of the fire and fuels management actions above.

Where suppression would be restricted in cultural resource management areas (CRMAs) (e.g., by limits on retardant or heavy equipment use), effects on the fire and fuels program would be similar to those described for special management areas below. Other cultural resource management actions that could affect the fire and fuels program consist of developing and maintaining interpretive sites and exclosures. Exclosures in some of these areas would limit livestock use of the area. Limiting livestock use would increase the fine fuels in the exclosure, causing an increased potential for fire spread. Interpretive sites encourage human use and could increase the potential for human-caused ignitions. They would also be likely to influence fire management during an incident by creating priority protection areas, which could add to the suppression cost of an incident.

Effects of utilities management actions on the fire and fuels program include increased potential for human-caused ignitions during construction and maintenance, and creation of priority protection areas during fire incidents. In some instances, the utility corridor might act as a linear fuel break. The main impacts would result from management actions of the fire and fuels program itself and the vegetation, forestry, and grazing programs. All of these programs would reduce fuel loads on the landscape and therefore could decrease the probability of large, catastrophic wildfires in the long term. Actions in these programs are also designed to improve structural, seral, and biotic diversity of plant communities and would create healthier plant communities with a more natural fire regime.

The fire management strategy would continue to be full suppression across 299,000 acres of BLM-administered land. Over the long term, the combined effects of the proposed actions would gradually convert degraded communities with condition class ratings of 2 and 3 to communities with condition class ratings of 1 or 2. The timeframe needed for this conversion would be a function of the current degree of departure from Condition Class 1.



In addition to fuels reduction treatments, the use of public fuelwood cutting on 15,000 acres could help reduce woody fuels and prepare denser juniper stands for treatments using prescribed fire. Rehabilitation would emphasize native species, thereby helping establish native communities while allowing the use of introduced species as an intermediate step to stabilize communities and facilitate the restoration process. Up to 60 miles of new temporary and permanent roads would be built, providing access for suppression vehicles and fuel breaks in some communities.

Fuels reduction treatments would use a broader variety of methods and the total area benefiting from these treatments over the lifetime of the plan would be double (200,000 versus 100,000 acres, respectively). Rehabilitation efforts would be more extensive and would focus on restoring forest and range resources. Rehabilitation would emphasize native species, thereby helping establish native communities while allowing for the use of introduced species as an intermediate step to stabilize communities and ease the restoration process.

### 4.6.5 Cumulative Effects

All actions include a combination of AMR and WFU for most of the field office area. Both of these strategies can be used as tools to achieve fuel treatment targets and maintain ecosystems. They would help restore natural fire on the landscape and are expected to reduce suppression costs. They could also help to educate the public on the natural role of fire in the ecosystem.

Increased use of prescribed fire and mechanical fuel reduction would ultimately result in smaller and fewer wildland fires from reduced fuel loading. Fire severity and intensity would also decline. These actions would also result in more natural potential vegetation groups across the landscape. The Preferred Alternative would result in a correspondingly lower increase in fuel treatment costs.

Juniper reduction is included as part of the fuels treatment strategy. Juniper reduction would address some of the ecosystem restoration goals, such as returning sites to a sage community rather than juniper woodland. These treatments would not necessarily be focused on the WUI. They most likely would occur on rangeland. This approach would promote ecosystem restoration across the landscape and also could affect the size and occurrence of fires in these areas and, in turn, could affect suppression costs. The fuels treatment program cost would also be affected because these restored communities would need to be maintained using prescribed fire. The Preferred Alternative includes large targets for juniper reduction. This approach would increase the potential for human-caused ignitions from mechanical treatments as well as the opportunity for escapes while using prescribed fire. Cumulative effects are not significant.

### 4.6.6 Mitigation Measures

Education will emphasize community protection procedures and public safety measures. AFO fire managers are committed to providing fire education help to communities that have been or may be threatened by wildland fires. Active community participation and citizen-driven solutions are essential to reducing the risk of fire in the WUI. More specifically, the AFO supports citizen education on the following:

- fuel reduction and the effects of fire,
- the development of community wildfire protection plans, and
- volunteer firefighter refresher training (on a yearly basis).

The field office also equips rural and volunteer firefighters when it can get funding. Communities may take action to live safely in fire-prone areas by availing themselves of grant programs such as rural, state, and volunteer fire assistance and economic action programs through state and federal agencies.

To reduce fire risk, vehicles and equipment used to implement treatments and transport people and equipment to treatment areas would be restricted to authorized routes or equipped with spark arresters. BLM would manage prescriptive treatments in high-use recreation areas and during special seasons (e.g., big-game rifle hunting in the fall) to reduce or eliminate resource use conflicts as needed. To reduce wildland fire risk, after wildfires and prescribed burning, BLM would use seed with shrub/grass/forbs to reduce cheatgrass and other noxious weeds and non-native species in high-risk areas. AFO fire and resource managers work with communities, fire safety councils, and other government agencies to recognize wildland fire hazards and create mitigation strategies. Fire officers also provide public education on fire ecology and fire as a natural ecosystem process.

### **4.6.7 Unavoidable Adverse Impacts**

Recreation actions that increase public visitation would have unavoidable adverse impacts on fire management by increasing the risk of human-caused ignitions. Mineral development and the creation of designated recreation routes and areas would create unavoidable adverse impacts by restricting the restoring of natural fire regimes in some areas. In vegetation communities prone to annual invasive species, wildland fire might cause the area to be further overtaken by these species. Actions in these programs are also designed to improve structural, seral, and biotic diversity of plant communities and would result in healthier plant communities with a more natural fire regime. Over the long term, the combined effects of the proposed actions would result in the gradual conversion of degraded communities with condition class ratings of 2 and 3 to communities with condition class ratings of 1 or 2.

### **4.6.8 Short-Term Uses Versus Long-Term Productivity**

None.

### **4.6.9 Irreversible and Irretrievable Impacts**

None.

## **4.7 Potential Effects on Forestry**

The following discussion explores direct, indirect, and cumulative effects as a result of implementing proposed management actions under the Preferred Alternative. Impacts from proposed actions under the following programs are not discussed because effects on forestry and the forest resource would be negligible to minor. These programs are air quality; noxious weeds; special status plants; wild horses; WSRs; livestock grazing; lands and realty; energy and minerals; recreation; utilities, transportation, and telecommunications; ROS; travel management; historic trails; and cultural resources. However, impacts from decisions concerning the management of fire and fuels, soil, wildlife, water supply, and visual resources may have significant effects on the forestry program and are discussed herein.

### **4.7.1 Methodology and Assumptions**

Impact assessment is based primarily on vegetation surveys and inventories of AFO forest resources. The location and distribution of commercial forestland was obtained from Sustainable Yield Unit (SYU) 15 plot data and the timber production capability classification.

Indicators used to describe the condition of forest resources include:

- species composition
- stand age
- successional stage
- standing volume
- basal area
- stand health

However, current stand data are not available for these indicators (see “Incomplete or Unavailable Information”). Forest health is primarily concerned with vegetation vigor, fuel hazards, and the presence of and susceptibility to forest insects and pathogens. The effects of management decisions for other resource programs were, therefore, evaluated on the basis of how they would affect forest health and the use of forest resources.

### **4.7.2 Incomplete or Unavailable Information**

This analysis assumes that budgeting and resource allocation will remain at present levels and that forest management will emphasize forest health and reduction of wildland fuels for the foreseeable future. Forests in the AFO planning area have not been extensively surveyed for hazardous fuel loads. Ocular inventories have found an excess of hazardous fuels in all forests managed by this office. Most would respond favorably to fuel reduction treatments.

Recent inventory of growing stock, growth and yield, or other forest health parameters has not been conducted. Plots were inventoried in 1974 to calculate allowable cut, and an inventory was conducted in 1977 to identify lands capable of commercial timber production. Later (1985), stands were examined and treatment recommendations formulated. At this point, new forestry prescriptions will need current information to once again determine and recommend suitable treatments--particularly regarding the quantity of biomass and saw log material that may be harvested.

### 4.7.3 Analysis

This analysis defines levels of effects on forest resources as follows:

**Negligible:** Forest resources would not be affected and impacts would be at or below the level of detection. Effects would be slight and, if measurable, would not have perceptible consequences for forests and woodlands.

**Minor:** Impacts on forest resources would be detectable, but small and localized, and of little consequence to forests and woodlands. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

**Moderate:** Impacts on forest resources would be readily detectable but somewhat localized, with significant consequences to forests and woodlands. Mitigating measures to offset adverse effects would be extensive but probably successful.

**Major:** Impacts on forest resources would be obvious and widespread with substantial consequences to forests and woodlands. Mitigation measures to offset adverse effects would be very extensive and success would not be guaranteed.

### 4.7.4 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse impacts and moderate to major beneficial effects to forestry management. The Preferred Alternative emphasizes multiple use and sustainable yield, combined with mitigation measures and stipulations for resource protection. Silviculture would emphasize mechanical thinning and prescribed fire. Mechanical thinning is the most cost-effective option and yields commercially valuable wood fiber. Greater restrictions on the use and management of forest resources would apply, when compared to No Action. Liberal use of mechanical thinning would be a major factor in promoting forest health. Where land health standards are not being achieved, forest management issues would be addressed when a project is proposed.

Fuel reduction efforts would substantially benefit forests and would have the second greatest impact under this alternative, although not all projects would be in forested areas. Mechanical thinning would be used to treat 12,000 acres over the life of this PRMP. 13,800 acres would be treated using prescribed fire. However, state air quality standards may, at times, disrupt fuel management efforts if prescribed burns exceed daily emissions standards. Fuel reduction efforts under the Preferred Alternative would have moderate to major, long-term benefits for forest resources.

Fire strategy for the Preferred Alternative is AMR for virtually the entire management area. WFU would be limited to 16,998 acres. This strategy would give resource specialists and fire-fighters flexibility in the way wildfires are managed. Under suitable conditions, fires may then be fought in such a way that resource management objectives (e.g., fuel reduction, stand improvement, vegetation treatment for wildlife habitat) can also be achieved, or at least not compromised. This management would also permit fires to consume some non-forest fuels, thereby decreasing the risk of wildfire extension into forestlands.

Mechanical thinning would remove canopy fuels, decrease the risk of catastrophic wildfires, improve forest health, and yield saleable logs. This combination of fuel management efforts and fire-fighting policy would significantly reduce fuel accumulation and eventually lead to overall moderate, long-term benefits, primarily by reducing hazardous fuels. This will decrease the size, intensity, and duration of wildfires. Vegetation treatments aimed at improving wildlife habitats would also have moderate benefits for the forest resource.

Virtually the entire 13,800 acres of commercial and low-site forests would benefit over the life of this RMP. A 5,000-acre decrease in severe, stand-replacing wildfires is possible under this alternative, primarily due to increased emphasis on fuel management.

Protection of soils and restoration of soil condition will have minor impacts on forestry. Restrictions on the use of heavy equipment, management actions for the recovery of degraded soils, and decisions regarding road placement will tend to have an overall beneficial effect on forestry. General management guidelines for soils will benefit forestry by limiting activities to the most suitable soils, thereby improving soil aeration, water infiltration, and sub-surface plant growth. Limitations placed on the use of heavy machinery could favorably affect forestry practices, promoting the growth of desirable crop trees and improving overall forest health.

Land transactions that consolidate forest lands under AFO management and, conversely, dispose of small, isolated parcels would benefit forestry by reducing management problems and costs. ROW and utility corridor management would have negligible effects on the forestry program.

Fire rehabilitation plans and aspen improvement projects (including aspen fencing) benefit forestry by encouraging regeneration and growth of aspen clones.

### 4.7.5 Cumulative Effects

The area of analysis for cumulative impacts on the forest resource is confined to areas classified as coniferous forest, juniper woodland, black oak woodlands, and aspen-riparian shrub communities—as identified on Map VEG-1 (“Vegetation Classes.”) Resource management decisions outside these areas are not expected to have significant effects on forest management. Conversely, forest management decisions are not expected to have significant influence on resources outside forested areas.

Cumulative effects on forests largely concern fuel reduction activities and wildfire. Allowing the excessive accumulation of forest litter provides fuel for wildfires and increases their intensity and duration. Intense wildfires damage or destroy organic soils and compromise their ability to absorb water. It also results in hillside and bank erosion and causes stream siltation.

Cumulative effects from invasive juniper include reduced water availability for trees and understory forbs, grasses, and shrubs. It also reduces water and forage availability for wildlife. Juniper expansion into coniferous forests and aspen stands compromises the growth and overall health of these forests. This plant has similar effects in aspen stands. Since European settlement began, Bartos and Campbell (1998) have estimated that 60 to 90% of aspen stands in the western U.S. have been eliminated or dominated by other species as a direct result of fire exclusion.

Expected increases in recreation and other activities may have cumulative effects on forest management practices by altering the availability and/or desirability of some treatment methods—especially those designed to reduce crown bulk density, ‘ladder’ fuels, and invasive juniper. Much of this activity may, in future, be limited to areas distant from communities and well-traveled roads where, unfortunately, the need for thinning or removal is greatest. Cumulative effects are not significant.

### 4.7.6 Mitigation Measures

- Use best management practices (BMPs) in compliance with Section 208 of the (federal) Clean Water Act (PL 92-500) to reduce short-term adverse impacts of forestry practices.

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- Locate and clearly identify (flag) cultural resource sites. Avoid and protect these sites to prevent the necessity of listing them with the SHPO.
- Use limited operating periods or buffer zones to avoid adverse impacts to nests, dens, and fawning/calving areas.
- Incorporate VRM class requirements in project design.
- Utilize the integrated weed management (IWM) program and incorporate standard measures for control of noxious weeds (see the AFO Noxious Weed Prevention Schedule [Appendix F].)
- Use interdisciplinary methods for project design.

### **4.7.7 Unavoidable Adverse Impacts**

There are no unavoidable adverse impacts if suitable mitigation measures are applied and enforced.

### **4.7.8 Short-Term Uses Versus Long-Term Productivity**

Adverse short-term effects from vegetation management activities, such as prescribed burns or mechanical treatments, would be overwhelmingly compensated by long-term productivity gains for forests and woodlands.

### **4.7.9 Irreversible and Irretrievable Impacts**

Some loss of soil (erosion), and soil compaction, will result from vegetation treatments.

## 4.8 Potential Effects on Lands and Realty

This section discusses the direct, indirect, and cumulative effects on lands and realty as a result of implementing proposed management actions under the Preferred Alternative. Lands and realty management in the AFO is organized into three program areas: land tenure adjustment (including access acquisition), mineral withdrawals, and granting ROWs.

### 4.8.1 Methodology and Assumptions

Effects on lands and realty were considered *adverse* if they restrict or create higher costs for proposed realty actions.

Effects were considered *beneficial* if they simplify or reduce costs of proposed realty actions

### 4.8.2 Incomplete or Unavailable Information

All land tenure adjustments and access acquisition proposals are considered on a case-by-case basis and are subject to evaluation under FLPMA and NEPA to determine suitability for disposal or acquisition. It is therefore not possible to identify specific parcels or the full extent of land tenure adjustment that may occur within the management area of the field office, for the life of the plan.

### 4.8.3 Analysis

For the purpose of analysis, the level of effects on lands and realty are defined as follows

**Negligible:** The effect would be barely detectable; the public would not be affected, and there would be no measurable change.

**Minor:** The effect would be slightly detectable, and the public might be affected.

**Moderate:** The effect would be readily apparent; there would be a measurable change that could result in a small but permanent change, and the public would be affected.

**Major:** The effect would be severely adverse or exceptionally beneficial, and the public would be affected.

### 4.8.4 Land Tenure Adjustment

BLM recognizes local government concerns over net gains of public lands within the respective counties and would continue to consider these concerns during land tenure adjustment processes.

The potential acquisition of the Pacific Gas and Electric Company's (PG&E's) Pacific Forest and Watershed lands would increase public land ownership in Shasta County by 6,000 to 7,000 acres.

Cultural and historical sites, special area designations, special status species, fish and wildlife habitat, wetland/riparian habitats, water and fisheries issues and other resource values may limit lands available for exchange or disposal in any area.

Completion of potential land tenure adjustments could reduce the need for access acquisitions.

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Priorities for land tenure adjustments would focus on opportunities to consolidate land ownership patterns, facilitating better management practices.

Priority would be given for acquisition of lands containing significant paleontological or cultural resources, special status species habitat, riparian/wetland habitat, crucial wildlife habitat, and high value recreation areas. Lands would be acquired through donation, purchase, or land exchange from willing partners.

BLM would pursue easements from willing partners to provide access to land locked public resources.

### **4.8.4.1 Analysis of the Preferred Alternative**

The net effect on land tenure adjustment actions would be negligible to minor. The Preferred Alternative is expected to meet all of the field office land tenure adjustment needs.

BLM would implement the Land Tenure Adjustment Plan, but would modify it to include both the conservation easement pilot project and the Madeline retention/acquisition area proposal.

Land Tenure Adjustment Plan priorities would likely be influenced by ACEC designation on 29,171 acres.

Priorities may include acquisition of portions of Smith and Nelson Corral Reservoirs and Delta Lake. PG&E Forest and Watershed lands would possibly produce economic benefits to Shasta County.

### **4.8.4.2 Cumulative Effects**

BLM recognizes local government concerns over net gains of public lands within the respective counties and would continue to consider these concerns during land tenure adjustments processes. Cumulative effects are not significant.

### **4.8.4.3 Mitigation Measures**

None.

### **4.8.4.4 Unavoidable Adverse Impacts**

There are no unavoidable adverse impacts.

### **4.8.4.5 Short-Term Uses Versus Long-Term Productivity**

There is no known loss in land productivity as a result of the Preferred Alternative.

### **4.8.4.6 Irreversible and Irretrievable Impacts**

The Preferred Alternative accommodates land tenure adjustments that may result in the permanent loss of lands from public ownership if they enter private or state ownership.



## **4.8.5 Mineral Withdrawals**

### **4.8.5.1 Preferred Alternative**

Mineral withdrawal would be recommended on 32,993 acres. The net effect on mineral withdrawal actions would be negligible to minor. The Preferred Alternative is expected to meet all of the field office mineral withdrawal needs.

### **4.8.5.2 Cumulative Effects**

Because of the lack of mineral resources in the area, there are no cumulative impacts.

### **4.8.5.3 Mitigation Measures**

There are no mitigation measures necessary for proposed mineral withdrawal.

### **4.8.5.4 Unavoidable Adverse Impacts**

There are no unavoidable adverse impacts for mineral withdrawal.

### **4.8.5.5 Short-Term Uses Versus Long-Term Productivity**

There is no known loss in land productivity as a result of the Preferred Alternative.

### **4.8.5.6 Irreversible and Irretrievable Impacts**

Because of the lack of mineral resources in the area, there are no unavoidable or irretrievable impacts.

## **4.8.6 Access Acquisition**

### **4.8.6.1 Preferred Alternative**

The net effect on access acquisition actions would be minor to moderate. The Preferred Alternative is expected to meet all of the foreseeable field office access acquisition needs.

Recreation and wildlife management would be the primary factors impacting access priorities. Access acquisition to areas of potential high recreational usage would have a greater priority under this alternative.

Public access to the PG&E Forest and Watershed lands would possibly produce economic impacts to Shasta County

### **4.8.6.2 Cumulative Effects**

BLM recognizes the desirability of access for efficient utilization and management of all federal lands. BLM also recognizes the public's desire for legal access to public lands for recreational purposes. Cumulative effects are not significant.

### **4.8.6.3 Mitigation Measures**

There are no mitigation measures necessary for access acquisitions.

#### **4.8.6.4 Unavoidable Adverse Impacts**

There are no unavoidable adverse impacts for access acquisitions.

#### **4.8.6.5 Short-Term Uses Versus Long-Term Productivity**

There is no known loss in land productivity as a result of the Preferred Alternative.

#### **4.8.6.6 Irreversible and Irretrievable Impacts**

No permanent public access will be lost as a result of access acquisition.

### **4.8.7 Rights-of-Way**

#### **4.8.7.1 Methodology and Assumptions**

This section describes the potential impacts on granting ROWs for utilities, transportation, and telecommunications. The location and nature of future ROW applications are not known. Specific applications or proposals would be subjected to project-specific NEPA analysis, which would identify needed restrictions in the form of mitigation measures, and the results of this analysis would be considered in the decision at the ROW project level. A ROW application may be approved as submitted, denied, or substantially affected or altered to avoid or mitigate impacts on other resources and the environment. The mitigation measures identified in the NEPA process would be implemented as terms and conditions of the ROW grant.

For this analysis, the actions are considered at a programmatic level for their potential effects on the ability to acquire ROWs or other forms of access. For those areas open to ROW acquisition and access development, restrictions often are applied to avoid or mitigate potential effects on other resources and the environment. These restrictions are identified, to the extent practicable, at the planning level. Refinement of these restrictions and identification of other needed restrictions are often not feasible until proposed locations are identified in a specific ROW application or proposed access route.

The range of potential effects on ROWs or other forms of access includes:

- ROWs would not be available in certain areas.
- ROWs would be available that fully meet the applicant's needs.
- ROWs would be available, but with restrictions that could make the ROW less useful, more costly, or both.

Effects rights-of-way were considered *adverse* if they restrict or create higher costs for proposed rights-of-way authorizations.

Effects were considered *beneficial* if they simplify or reduce costs of proposed rights-of-way authorizations.

#### **4.8.7.2 Incomplete or Unavailable Information**

All ROW proposals are considered on a case-by-case basis and are subject to evaluation under FLPMA and NEPA to determine suitability for authorization or rejection. Since ROW requests are driven by customer needs, it is impossible to evaluate specific possibilities at this time.

#### **4.8.7.3 Analysis**

For the purpose of analysis, the level of effects on ROWs is defined as follows:

**Negligible:** The effect would be barely detectable; the public would not be affected, and there would be no measurable change.

**Minor:** The effect would be slightly detectable, and the public might be affected.

**Moderate:** The effect would be readily apparent; there would be a measurable change that could result in a small but permanent change, and the public would be affected.

**Major:** The effect would be severely adverse or exceptionally beneficial, and the public would be affected.

#### **4.8.7.4 Impacts Connected to All Rights-of-Way**

This section describes the type of effects that can occur to potential ROW and access projects as a result of lands being unavailable and the restrictions that would be applied on available lands. Lands would be unavailable for ROW project development or would be available subject to certain restrictions that would be determined as a result of project-level NEPA analysis. The categories of lands that could be unavailable include, but are not limited to:

- WSAs – all proposals must meet non-impairment criteria, which prohibit permanent facilities unless grandfathered or valid existing rights.
- ACECs – restrictive stipulations would apply depending on the purpose of the ACEC.
- WSRs and candidate rivers – restrictions would be similar to WSAs.
- Research natural area (RNAs) – restrictive stipulations would apply depending on the purpose of the RNA.

Types of areas that may result in application of additional stipulations include, but are not limited to:

- Sensitive biological habitats.
- Areas with highly erodible soils on steep slopes.
- Heritage and historic resources.
- Areas with highly unstable slopes or areas with unique geologic resources.
- Sensitive watersheds or riparian areas, or where water quality or quantity or aquifer conditions are likely to be affected.
- Recreational opportunity areas.
- Scenic resources.

For areas not closed to ROW grants, the NEPA process at the ROW application stage provides site-specific analysis and information valuable in determining whether to grant specific ROW applications and, if so, what specific mitigation measures to be implemented with each ROW grant to protect other resources. For example, the effects of additional project stipulations may require restrictions such as no access or use during periods of high recreational use or periods critical to species reproduction.

Impacts on potential ROWs are primarily socioeconomic. Placing lands in unavailable categories or requiring measures to mitigate effects on other resources can result in a proposed ROW or access being more costly, uneconomical, or even infeasible. The purpose of access routes and linear feature ROW grants, such as pipelines, roads, and transmission lines, is to connect two geographic locations with a form of infrastructure. Connecting two geographic areas may not be feasible given the unavailable land areas in the vicinity. Avoidance of sensitive resources and restricted areas such as Wilderness areas, WSAs, and ACECs, could necessitate a much longer route, with economic implications. Restricting use of a ROW or access route to only certain times of the year in order to protect wildlife during periods critical to their reproduction or to avoid conflicts during recreational seasons may not meet the ROW purpose and need—or could result in an economic impact on the ROW grant holder.

Most utility corridors are designed to extend along existing transportation routes or to parallel existing ROW projects. By consolidating compatible transportation and utility projects to existing corridors, the agency can reduce habitat loss, degradation of resources, and fragmentation of public land ownership patterns. However, this can increase costs and disutility to a ROW grantee if this approach results in a longer or more expensive project. Consolidation of ROW grantees at existing communication sites can cause user conflicts and electronic interference. The existing corridors or communications sites may not be the optimum location, given the purpose and need for the ROW.

VRM would impose impacts on utility and telecommunication infrastructure sites by imposing stipulations to reduce visual impacts within the viewshed of major travel routes or areas of high scenic value

BLM maintains certain public roads on federal lands. Maintaining these roads can result in both positive and adverse effects. Improved access can result in more users, creating increased direct and indirect impacts on other natural resources values; these effects are discussed in the respective resource sections in this chapter. Improved access also results in increased social and economic benefits to road users, including private in-holders, grazing interests, recreational users, and BLM administrators.

Not maintaining existing roads can result in positive or adverse effects, depending on the amount of use. If a non-maintained road becomes impassable, the social and economic benefits of access are foregone and the indirect impacts on other resources caused by the access would not occur. Roads that are not maintained or closed but are still passable can result in use that accelerates erosion and increases vehicle maintenance costs. Indirect effects can occur to riparian areas and water quality through sedimentation from increased road erosion.

### 4.8.7.5 Analysis of the Preferred Alternative

The Preferred Alternative seeks to meet the public needs for ROWs and access by identifying areas with the least adverse impact on other resource for such uses. The acreages identified under the No Action Alternative would remain unavailable for ROWs. In addition, of the 29,171 acres of new ACECs to be designated, 9,290 acres fall outside preexisting WSAs. Similarly, 2.5 miles of the 18.5 miles recommended for designation as WSRs fall outside preexisting WSAs.

BLM would seek to maximize use of the 15 acres of sites designated for communications purposes by fully utilizing these sites before opening new ones. This would minimize land and resource impacts while meeting communications facility needs.

Where feasible, BLM would seek to expand existing transmission line and pipeline project width up to a maximum total of 250 feet off of the centerline and designate existing lines as utility corridors.

BLM would hold ROW grantees responsible for removing abandoned facilities from public land. This would reduce potential adverse safety impacts and would improve the scenic environment.

BLM would develop a transportation plan and access priority list that would help to minimize adverse impacts on natural resources and the environment by providing access for valid uses in a way that avoids or mitigates adverse effects. The transportation plan would coordinate road maintenance and construction needs with fire protection needs, juniper management needs, and SRMAs. The access priority list would focus acquisition access activity on areas that would yield the greatest natural resources management benefit first, followed by public social and economic benefit. BLM would seek to acquire legal public or administrative access to public land, resources, and facilities where necessary for protection of natural resources and to maintain existing legal public and administrative access to public land. BLM would prioritize acquisition of legal public and administrative access through or around private lands to public land, resources, and facilities. New roads may be constructed where access is restricted and the cost associated with acquisition is excessive, or where acquisition is not feasible.

During plan development, BLM would maintain 28 miles of roads for access to existing ROWs. If funding becomes available, BLM would complete other roadwork necessary to facilitate various resource management projects. Such projects may include development of a stock trail along the Tule Mountain Access Road. Roads may be 'Closed' where OHV use is not in conformance with the Recommended Off-Highway Vehicle Management Guidelines adopted by the Northeast California Resource Advisory Council in 2000.

Generally, BLM would seek to minimize acreages impacted by land use or ROW authorizations. This involves utilizing existing corridors or sites to their maximum reasonable capacity. Proposals for use outside of existing corridors or sites would be evaluated on a case-by-case basis. Interagency recommendations for ROW corridors would be beneficial.

The overall adverse effects to ROWs would be negligible to minor.

### **4.8.7.6 Cumulative Impacts**

Site-specific analysis of cumulative effects is not possible due to the uncertainty of the time and location of future ROW proposals. However, the cumulative impacts on potential ROW and access projects typically would result in either less land available or higher costs of operations due to the following factors:

- Increasing acreage of public land that is not available for ROW development.
- Increasing number of stipulations and conditions associated with ROW grants.
- Increasing cost of reclamation and bonding.

The effects on ROW grants and other access vary to the extent that lands would be open or closed to such activities and, if open, the restrictions placed on the ROW grant. The magnitude of the effects would be relative to the amount of lands not available for ROW and the specific stipulations applied to the ROW grant at the time the grant is issued.

### **4.8.7.7 Mitigation Measures**

There are no mitigation measures necessary for ROWs under the Preferred Alternative.

**4.8.7.8 Unavoidable Adverse Impacts**

No unavoidable adverse impacts to ROWs are proposed under the Preferred Alternative.

**4.8.7.9 Short-Term Uses Versus Long-Term Productivity**

None.

**4.8.7.10 Irreversible and Irretrievable Impacts**

None.

## 4.9 Potential Effects on Livestock Grazing

This section analyzes the beneficial and adverse effects on livestock grazing as a result of implementing proposed management actions under the Preferred Alternative. Comparison is based on the current state of grazing lands and the present management situation.

The timing and duration of livestock grazing is managed under recognized grazing systems and can impact the health and vigor of vegetation. The three major components of a livestock grazing régime are: vegetation allocation, grazing systems, and range improvements. Vegetation allocation is adjusted according to monitoring data, particularly grazing allotment evaluations. Each allotment is assessed according to rangeland health standards and accepted grazing guidelines. Vegetation allocations are then set so that livestock utilization impacts are at an acceptable level.

Grazing lands are grouped in one of four categories under the land health standards and guidelines. Livestock grazing is least restricted where land health standards have been achieved or where the state of one or more standards are not known. The greatest restrictions apply where land health standards have not been met or significant progress made toward their achievement *and livestock grazing is a significant contributing factor*. Livestock grazing is also restricted where this last situation exists and causes are other than—or in addition to—livestock grazing. These restrictions are applied in order to protect and conserve sensitive resources.

### 4.9.1 Methodology and Assumptions

Impact analysis is based on the following body of assumptions:

- Livestock grazing on BLM-administered lands will be governed by applicable legislation and regulations, especially the 2000 Rangeland Health Standards and Guidelines for Northeastern California and Northwestern Nevada (S&Gs).
- Livestock grazing will continue where this activity is permitted and sustainable.
- The baseline and maximum area presently available to grazing is 454,649 acres.
- The present level of active AUMs available under permits is 54,881 AUMs.
- Currently, actual use averages about 27,000 AUMs per year.
- There are 145 grazing allotments.
- Road closures concerned with recreational OHV use do not include vehicles required for livestock activities conducted under permit.

Increases or decreases in forage availability were used as an indicator of beneficial or adverse effects (respectively) on livestock grazing from proposed actions under the various resource programs.

Assessment of impacts on the grazing program was based partly on direct evaluation of prescribed changes in grazing use (and resulting AUMs) as a result of mechanical treatments or prescribed fire, and partly on expected indirect effects from changes in the economics of production.

### 4.9.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects of proposed management actions on livestock grazing at the RMP level.

### 4.9.3 Analysis

This analysis defines levels of effects on livestock grazing as follows:

**Negligible:** Grazing operations would not be appreciably affected by increased (or decreased) costs or changes to forage quality and quantity. Average annual AUMs and the amount of land available to livestock grazing would remain constant.

**Minor:** Effects would be small but detectable and only slightly increase or decrease the cost of livestock grazing. Changes in AUMs or the amount of land available to livestock use would not exceed a 5% change from the current level.

**Moderate:** Effects would be readily apparent and would somewhat increase or decrease the cost of livestock grazing. Changes in AUMs or the amount of land available to livestock use would not exceed a 15% change from the current level.

**Major:** Effects would be obviously adverse or beneficial and would substantially increase or decrease the cost of livestock grazing. Changes in AUMs or the amount of land available to livestock grazing would exceed a 15% change from the current level.

**Short-term:** Anticipated effects occur within 1 to 5 years of implementation.

**Long-term:** Effects generally occur after the first five years following treatment and persist for as much as 20 years (within the life of this RMP).

### 4.9.4 Impacts Common to All Livestock Grazing

About 5,000 acres are within fenced enclosures in which livestock grazing is infrequently authorized and only when needed or compatible with meeting the site-specific resource objectives. New livestock-enclosures under the Preferred Alternative would be needed to mitigate the impacts of livestock grazing on other resources. New enclosures would generally be small (less than 10 acres) and would have minor adverse impacts on livestock grazing due to a reduced amount of area authorized for such grazing. Enclosures would also have a negligible adverse impact on livestock grazing due to occasional death loss of cattle trapped within enclosures.

BLM is not expected to require any allotments to be retired under the Preferred Alternative from livestock grazing as a result of resource use conflicts.

The highest utilization allowance for native rangelands is now 40-60%. The approved S&Gs (BLM 1988a, 1999b) were implemented in 2000. They require that Guideline 16 (controls on utilization) be implemented, as suitable, on allotments that are not meeting or making progress toward meeting land health standards as a result of current livestock utilization.

Wild horses can affect livestock grazing both directly and indirectly. Grazing by horses directly reduces the amount of forage and water available for livestock. Indirectly, wild horses are present within HMAs year-round unless feed and water are no longer adequate to meet the needs of the herd.

At that point, a herd would move off the HMA frequently to access feed and water, impacting adjoining livestock ranches and other BLM lands. The intensity of wild horse use is controlled by managing the number of wild horses that are in wild horse herd areas.



However, the season, duration, and frequency of wild horse use cannot be controlled. Therefore, impacts of wild horse use, particularly in special habitats and natural concentration areas, under the Preferred Alternative, would occur annually.

Actions to restore soils and native rangelands can have both short- and long-term impacts on livestock grazing under the Preferred Alternative. Areas that are seeded or allowed to regenerate naturally after wildfire, prescribed fire, or other disturbance need to be rested from livestock grazing for one to two growing seasons. In the short term, the loss of acreage available to livestock grazing is an adverse impact. In the long term, livestock benefit from the following:

- retaining soil,
- eliminating noxious and invasive weeds, and
- restoring native rangelands to healthy, productive communities dominated by perennial species.

Restoring special habitats (timber, woodlands, and riparian areas) would have little effect on livestock grazing. These areas are generally small, and scattered, and contribute little to the livestock forage base. Restoring decadent sagebrush communities, cheatgrass converted communities, and grasslands would benefit livestock under the Preferred Alternative in the long term. Sagebrush and grassland communities are large and widespread and provide the bulk of the forage base for livestock in the planning area.

At least 10,154 acres (2% of the planning area) of upland soils that are not meeting land health standards would be restored under the Preferred Alternative. Improving these soils and the plant communities on them would negligibly benefit livestock grazing over the long term.

The AFO would manage archaeological resources under Section 106 of the NHPA. Compliance with Section 106 would result in minor to major effects on livestock grazing due to use reductions or delays in or prevention of building new and/or maintenance/reconstruction of existing livestock handling facilities, seedings, and water developments.

Energy and mineral exploration and extraction, and dispersed recreation adversely affect livestock grazing. These activities increase the number of people and vehicles that access remote areas. An increase in livestock theft and vandalism of handling and watering facilities increases or decreases with the number of people accessing remote areas. Current levels of dispersed recreation, and of energy and mineral exploration and extraction, are resulting in negligible to minor effects under the Preferred Alternative. Dispersed recreation is expected to increase, and adverse impacts from these activities would increase to minor to moderate levels.

### 4.9.5 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor adverse impacts and minor beneficial impacts to livestock grazing operations. Livestock grazing would be permitted on 454,649 acres; 48,396 acres would be unavailable for grazing for resource protection. Although ‘active’ AUMs would remain at 54,881, actual use AUMs would remain at approximately 27,000. Management of livestock would include adjustments to grazing systems—such as shortening season-of-use—where the land health standards are not being met. Allotment management plans (AMPs) for category 1 allotments would be completed or revised. Up to 10,000 acres would be treated annually using prescribed fire and up to 16,998 acres in one year would be available for WFU. Additional acreage would be treated through natural fire events involving an appropriate management response that would hold moderate long-term benefits for livestock grazing. Mechanical and hand treatments will be used on an additional 10,000 acres/year. Livestock exclusion in the post-fire period is necessary for effective rehabilitation of burned areas, so this would have short-term adverse effects from changes in livestock use and decreased forage availability.

Rehabilitation of areas treated or effected by prescribed fire and AMR to wildfire events would result in a minor increase in the cost of grazing in the short-term but have long-term benefits by releasing the natural understory of shrubs and grasses.

A forage reserve program or “grassbank” would be established under the preferred alternative to reduce forage losses and other impacts to grazing operations from livestock exclusion as a result of fire effects and/or juniper reductions and would provide minor benefits to the livestock grazing program.

Up to 750 acres of firewood cutting would be permitted yearly under the preferred alternative. This could have some short-term adverse impacts on livestock from downed trees and scattered limbs. Negligible long-term positive impacts would result for livestock by an increase in the understory vegetation

Protection measures, such as fencing or changes in season of use, for sensitive plants and some riparian areas, cultural sites, and RNAs would be implemented on 129 acres per year or approximately 2,580 acres under the preferred alternative for the life of the plan. Permanent exclusions would be considered for most cultural sites; RNAs, some sensitive plants and permanent wetlands could also be protected by permanent structures. However, an effort would be made to cooperate and consult with the permittee to implement a change in season of use or other grazing strategy to protect these areas before permanently excluding them.

Additionally, permanent and/or temporary protection under the preferred alternative would target aspen stands on 15 acres/year until 250 acres are protected within the life of this plan. This would have a minor impact on the amount of forage available for livestock. Where aspen stands are located near livestock water, an attempt would be made to develop other sources. Three to four new or redeveloped water sources would be constructed yearly to improve livestock distribution with the most productive water sources redeveloped and protected first. This would amount to 60 to 80 redeveloped or new water sources within the life of the plan. This would have a moderate long-term beneficial impact on livestock grazing by providing more dependable livestock water and better distribution while still improving the watershed.

After treating juniper stands, consideration would be given to seeding locally adapted annuals and native and non-native perennials, on a site-specific basis. ‘Greenstripping’ would be used throughout the field office—specifically on the Likely Tablelands—including sites that consist of fire-prone vegetation such as medusahead and cheatgrass. Greenstripping is expected to have negligible long-term benefits to livestock and sagebrush obligate species by preserving the remaining sagebrush steppe plant communities in areas that have been repeatedly impacted by wildfire and providing additional forage.

Limiting land-disturbing activities around cultural sites may include some grazing exclusion. This may limit livestock grazing but would have negligible long-term effects on the cost of operation.

Depending on the desired future condition for a particular area, limiting livestock grazing on important pronghorn and mule deer wintering areas would have negligible long-term effects on the livestock grazing program and would more likely include changes in season of use. A change in grazing systems and season-of-use would be considered in the management of sage-grouse habitat. Such an initiative is underway, in concert with California Department of Fish and Game (CDFG), under local guidelines specified in *Conservation Strategies for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle, Likely Tablelands/Rocky Prairie and Devil’s Garden/Clear Lake Population Management Unit*.

An increase in mechanical juniper treatments (10,000 acres) could aide the dissemination of noxious weeds. Early detection, combined with effective planning prior to juniper treatment, will have moderate long-term benefits for livestock by maintaining the availability of forage.

There would be greater emphasis on public awareness and education, early detection, and prompt and effective control.

Protecting certain soils identified as needing rehabilitation is expected to have negligible effects in the long term on livestock grazing. The total surface area of restrictions identified during specific environmental assessments would be relatively low. Required mitigation measures may include season-of-use changes, reduction in livestock numbers, livestock exclusion, and various range improvements (such as seeding.)

Although OHVs are generally limited to designated or existing trails under this alternative, 80 acres of the Cinder Cone Grazing Allotment would have an 'Open' travel designation as an OHV management area. Forage quality and livestock utilization is likely to decline in this area due to trail proliferation and stress to livestock from frequent proximity to OHV vehicles. This could be partially mitigated by changing the frequency, intensity, and season of livestock use. However, effects would be negligible due to the small area involved.

Historically, land exchanges and acquisitions have not affected forage availability. Significant loss of forage is unlikely because contemplated land disposals are minimal. Future acquisitions or disposals may or may not change this. Impacts must be determined when acquisitions, exchanges, or sales are proposed.

Management under the Preferred Alternative may slightly increase or decrease forage availability. AUMs would be the same as presently authorized and management flexibility seems sufficient to accommodate the practical requirements of livestock operators as well as the requirements under the S&Gs. The overall impact of this management on the livestock grazing program is expected to be minor in the long term but beneficial—primarily because of the small area of long-term grazing closures and increased benefits from an increase in the number of prescribed burns and juniper treatments.

### 4.9.6 Cumulative Effects

The area of analysis for cumulative impacts on livestock grazing is defined as the AFO area boundary and the livestock operations that include public land grazing permits within the area administered by the AFO.

Adverse and beneficial effects on the livestock grazing program from any particular action proposed under the Preferred Alternative would be negligible when considered in the context of the entire AFO management area (503,045 acres.) However, there is potential for a combination of decisions and actions to have significant beneficial cumulative effects on livestock grazing due to management flexibility inherent in this alternative.

A probable scenario for such actions under the Preferred Alternative—and that most likely to have beneficial effects on livestock grazing—involves proposed management of invasive juniper and the restoration of sage-grouse habitats. Under proposed management, up to 10,000 acres of post-settlement juniper woodlands would be cleared (using mechanical and hand treatments) and measures taken to favor and encourage native sagebrush-steppe plant communities. Efforts are being made, in coordination with CDFG, to implement measures from *Conservation Strategies for Sage-Grouse and Sagebrush Ecosystems within the Buffalo-Skedaddle, Likely Tablelands/Rocky Prairie and Devil's Garden/Clear Lake Population Management Unit* that favor sage-grouse-friendly habitat conditions and bolster populations of this bird. While juniper reduction will have short-term adverse effects for livestock, the long-term effects would be quite positive by providing additional forage.

However, the likelihood of long-term changes in livestock grazing throughout the AFO in favor of sage-grouse habitat would be minor but moderate impacts could be felt on a site-specific basis.

Cumulative effects from a combination of decisions and actions involving vegetation treatments and protective exclosures, recreation and OHV use, wildlife management, land disposal, and cultural resource protection could also have significant adverse effects on the livestock grazing program *if concentrated on any one grazing allotment*. This would have moderate long-term effects on livestock grazing.

### 4.9.7 Mitigation Measures

None.

### 4.9.8 Unavoidable Adverse Impacts

Wild horses can affect livestock grazing both directly and indirectly. Grazing by horses as well as the increase in juniper cover directly reduces the amount of forage and water available for livestock. Indirectly, wild horses are present within Red Rock HMA, which includes several livestock allotments year-round unless feed and water are no longer adequate to meet the needs of the herd. Activities that directly disrupt or impact the soil surface (such as compaction by grazing animals and vehicles, exposure of soil surfaces to wind and water erosion) reduce the long-term productivity of the soil. Reduction in the productivity of the soil and vegetation adversely impacts the long term productivity of livestock operations as well.

### 4.9.9 Short-Term Uses Versus Long-Term Productivity

Short-term impacts from mechanical treatments in juniper woodlands under the preferred alternative would include grazing exclusion for two growing seasons. In the long term, vegetation may return with improved species diversity and increased forage available for livestock grazing. Prescribed fire treatment and wildfire would have a decrease in forage availability for livestock use in the short term, requiring changes in livestock grazing use. In the long term, these same fire treatment areas would have an increase in quantity and quality of forage available for livestock use.

### 4.9.10 Irreversible and Irretrievable Impacts

Local irreversible impacts could result from multiple management actions, such as juniper treatments and OHV/recreational uses conducted simultaneously in the same area, or livestock forage that is not harvested during periods of restoration or that is reserved for other uses, which would constitute an irretrievable loss of forage. Conversion of areas to non-native annual grass species, such as cheatgrass and/or medusahead, may be an irreversible adverse change to the composition of native plant communities and the forage they provide.

## 4.10 Potential Effects on Recreation Resources

### 4.10.1 Methodology and Assumptions

This section describes impacts on recreation according to changing access, settings, and opportunities as a result of implementing proposed management actions under the Preferred Alternative. A change in setting will bring about a corresponding change in opportunity (greater or lesser) to experience the desired recreational activity in a preferred setting.

When assessing the effects of other resource programs on recreation, the following assumptions were made:

- One of the most important aspects of recreation management is the growth associated with recreation resources. A market study of northeastern California conducted in 2002 identified non-vehicular activities, such as day hiking, as very popular in the region; however vehicle-based activities such as auto-based site-seeing and recreational driving were also very popular. Use of OHVs is a well-established activity on the existing network of rough dirt roads, primarily for hunting access and back-country sight-seeing (see the travel management section.) The key management challenge is to provide adequate public access and quality motorized and non-motorized recreational experiences while avoiding user conflicts and protecting resources and the environment.
- A route network for access and recreation will be designated in this RMP, based on a global positioning system inventory completed in 2004. Approximately 900 miles of roads and trails are located on public lands administered by the AFO (see Chapter 2.15 “Travel Management” and Map RI-1).
- All types of recreation are likely to increase over the 20-year planning period of this RMP. Demand will continue to increase from individuals and groups as local and neighboring counties (particularly Lassen, Modoc, Shasta, and Siskiyou Counties in California, and Washoe County, Nevada) continue to grow. Projected annual growth is 0.4% for Lassen County and 1.43% for Washoe County. Requests for special event and commercial recreation permits will increase as more clubs, community groups, commercial, and educational organizations come to rely on BLM-administered lands for easy access on a daily basis.
- Changes in recreation management will be gradual, the object being to meet immediate demand while minimizing resource damage. This will include implementation plans for new SRMAs, development priority being given to those closest to local population centers.
- As much as possible, SRMAs and other identifiable recreation areas will be created and managed according to easily identifiable public land blocks, major topographical features, or major road boundaries for more effective plan implementation and increased public awareness, understanding, and compliance with regulations.
- The need for trails with non-motorized designations will continue to increase, particularly near urban or residential areas. (See Chapter 2.15 “Travel Management”.)

### 4.10.2 Analysis

For the purpose of this analysis, effects on recreation are considered *adverse* if they would restrict or eliminate public access or affect the setting in a way that would decrease the opportunity for a quality recreational experience. Effects are considered *beneficial* if they increase opportunity and/or enhance the recreational experience.

**Negligible:** Change would affect recreation opportunity; however, it would be small, with no perceptible influence on recreation access or quality.

**Minor:** Change would affect recreation opportunity and would have a detectable, but highly localized influence on recreation access or quality.

**Moderate:** Change affecting recreation opportunity would be clearly evident, with an appreciable, but somewhat localized, influence on recreation access or quality.

**Major:** Change would be such that effects on recreation access or quality are obvious, substantial, widespread, and possibly permanent.

### 4.10.3 Incomplete or Unavailable Information

Adequate information was available to assess effects on recreation resources at the RMP level.

### 4.10.4 Impacts

Management actions such as inventory, evaluation, and categorization of sites are not expected to affect recreational opportunities or activities. Restrictions on recreational activities—such as area closures—would-be site-specific and would have minor adverse effects on recreation.

Fire management and fuel reduction activities are expected to cause temporary, localized disruptions due to area closures resulting from prescribed fire or other vegetation treatment procedures. This will not be discussed, except where a substantial difference in the size of the area treated makes this advisable.

Soil management practices include closing or realigning roads where this is required to protect sensitive resources, as well as minimizing new road construction. These activities may disrupt the continuity of the road network, reduce OHV recreation opportunities, and prevent the development of new routes to maintain the route network when other routes are ‘Closed’. Other management practices, such as grazing rest, maintenance of exclosures, and installation of erosion control structures are not expected to affect recreation opportunity.

Management actions protecting or restoring riparian and wetland areas, vegetation and forests, and wildlife habitats and populations would enhance natural settings and provide minor benefits for hunting, fishing, wildlife-viewing and other recreational activities. Efforts to control the introduction and spread of noxious weeds would also provide minor benefits for recreation by preserving or restoring natural habitats and species diversity. However, considerations for special status species may have negligible adverse effects on recreation, if management requires road closures or restricts some activities. These actions would be based on monitoring and evaluation. Their significance would be determined by the intensity and extent of such actions.

While management actions protecting the visual quality of WSAs, scenic and historic trail corridors, recommended WSR segments, and SRMAs would not directly affect recreation; they would have minor to major indirect benefits by protecting the natural setting of landscapes according to their VRM class. An undeveloped, natural-appearing landscape is an important component of what people are seeking in their outdoor recreational pursuits. Such benefits will be greatest in WSAs, where VRM Class I designations apply (ensuring that man-made visual intrusions are not visible).

The closure or relocation of roads to enhance water quality or protect soils may alter route network connections and adversely affect public access for hunting, fishing, hiking, and wildlife-viewing, as well as motorized recreation opportunities, if 'Closed' roads are not replaced with new ones. However, road closures may also benefit from these same activities (with the exception of OHV recreation) by providing a more natural setting and enhancing the quality of the recreational experience. The actual impact of such closures is difficult to determine until specific sites with soil and water quality degradation issues are identified; however, such activities are not expected to affect recreation opportunity and will not be discussed further.

Management of wild horses should not have adverse effects on recreation because anticipated activities do not include restrictions or closures that would alter existing recreation opportunities or settings. Potential benefits are identified, where applicable.

WSAs are 'Closed' to saleable (cinders and decorative rock) and leasable minerals (generally oil and gas and geothermal). Any locatable mineral claim within a WSA would have to meet non-impairment criteria that would not permit surface disturbance within the WSA (so that primitive settings are maintained.) Although locatable (hard rock) minerals are limited to relatively small sites, impacts on recreation can be substantial, depending on the location of claims. However, such impacts are unlikely, because the management area has little mineral potential. Therefore, activities relating to the extraction of mineral materials, oil and gas exploration and development, and locatable mineral development are expected to result in minimal impacts on recreation.

There is currently one (locatable) mining operation at Hayden Hill that is in the reclamation phase and no leasable resources have been developed. Saleable mineral resources are the primary mineral extraction activity, and consist mainly of cinder and decorative rock collecting. All such activities are site-specific and, historically, have not had adverse effects on recreation. Abandoned cinder pits actually have positive benefits for OHV recreation (where access is convenient).

In areas with significant recreational activity, timber harvesting will impose temporary disruptions. However, adverse impacts from forest management practices are not expected to have long-term adverse effects, because such actions are designed to improve forest health and should not alter or restrict recreational activities beyond short-term inconveniences. However, there are aesthetic issues related to old growth trees versus forest health that will need to be addressed individually for proposed timber sales, where such trees occur.

Recreational activities are pursued in conjunction with livestock grazing on most BLM-administered lands; therefore, continuation of this practice is not expected to have additional adverse effects. However, recreational fishing is a dominant activity in the management area, and there are especially significant adverse effects on this activity from grazing along creek, river, lake, and reservoir shorelines. Exclusion of livestock to improve riparian conditions around springs, stream banks, riversides, and lakeshores will have minor to moderate benefits for recreation by improving the natural appearance of the landscape, preserving wildlife and fish habitats, and minimizing visitor/livestock interaction.

Management actions concerning land acquisitions and disposals may directly benefit or have adverse implications for recreation, depending on the specific action and its location. New acquisitions would be available for recreational activities and permanent legal access may be obtained for BLM-administered lands currently used for recreational purposes, but where, in some cases, legal access has not been established.

## Chapter 4: ENVIRONMENTAL CONSEQUENCES

A range of ROS designations would apply. From 'Roaded natural' where recreational users can expect to have frequent contact with other visitors along well-used travel corridors and activity areas, to a 'Primitive' setting which would benefit non-motorized users and few other contacts could be expected.

New roads and trails in SPM areas would be developed solely for the purposes of resource protection (such as road or trail realignment) or expansion of trails for non-motorized use. This would have negligible benefits for non-motorized recreation; by helping maintain the natural setting of adjacent areas and increasing its value for (non-motorized) recreation.

Vehicle closures have existed on Fitzhugh Creek for over 25 years, in order to maintain riparian vegetation and preserve bank stability, water quality, and a healthy recreational coldwater fishery. This 660 acre parcel and 20 acres in Lava WSA to protect special status plants would be 'Closed' to OHVs. Approximately 1 mile of routes would remain 'Closed' to OHVs; this represents less than 1% of the total length of roads within the management area. It would have negligible adverse impacts on motorized recreation, would eliminate current user conflicts and enhance opportunities for high-quality, non-motorized recreation.

OHV *events* would be 'Limited to Designated Routes' in order to preserve wildlife habitat, prevent the spread of noxious weeds, and protect cultural sites and vulnerable soils. About 181 miles of routes are located in vertisol soils or (identified) medusahead-infested areas. Limiting vehicles to the existing road (in these areas) should have negligible adverse effects on recreation, since most vertisol soils are associated with rough, rocky terrain that precludes off-road travel in the first-place.

Restricting the Pit River to non-motorized boating would not adversely affect recreational opportunities. Rather, it would serve to maintain the silence and natural setting for users of the river. In like measure, unrestricted boating on the West Valley Reservoir will continue to provide a full range of water sport activities.

Non-motorized recreational travel will continue on two miles of the Pacific Crest Trail, a national hiking trail and an additional 25 miles of new trails. However, increased visitor use of the limited trail system may have minor adverse effects from overuse. This may lead to some degradation of the trails and a decrease in experiential quality for some recreational users (due to heightened levels of user contact).

Continued management of (most) BLM-administered lands for self-contained camping may result in higher levels of litter, resource damage, and wildfires caused by irresponsible campers. However, there are minor benefits to the public derived from the freedom to enjoy open spaces, the beauty of camping on public lands, and a multitude of desirable locations not limited to developed facilities.

Continued management of (most) BLM-administered lands for hunting and shooting (practice) will continue to provide a wide variety of recreation for hunters and shooters. However, the Pit River Recreation Area and the Dry Creek Station would remain 'Closed' to shooting for safety reasons. If shooting in high-use recreation areas becomes hazardous, restrictions or closures may be applied as required.

These closures have negligible adverse effects and are not expected to affect overall opportunities for the shooting sports.

Development of interpretive displays, brochures, and presentations would have minor beneficial effects for recreation by expanding visitor knowledge of natural and cultural resources. This will result in greater awareness, understanding, and enjoyment of BLM-administered lands.



It may also contribute to an increase in rural tourism, and some economic diversification and monetary benefits for local communities.

Protecting the Lassen, Applegate and Yreka historic trail traces (and associated lands) on 30 miles of BLM-administered land would have moderate benefits for recreation by preserving trail remnants and providing interpretive opportunities to increase visitor knowledge, understanding, and enjoyment. Trail enhancements may increase visitation and could lead to an increase in seasonal use that may change the common experience from a solitary or small-group activity to a more social one, incurring minor benefits. However, increased use may result in negligible to minor resource degradation. This is likely to be offset by the public benefit it would provide.

Current trail management plans would be employed to continue interpretive development of the Descent into Goose Lake (a part of the Applegate-Lassen Trail system), and foster visitor awareness of the Yreka (and other) historic trails and resources. An inventory and collection of information on two mid-19th century military patrol routes and two early wagon routes would be conducted. Forty miles of the Modoc railroad grade would be acquired for trail purposes that would benefit recreation as well as increase local and visitor knowledge and appreciation for historic trails and regional history. Development of the interpretive and educational potential of these trails is expected to have moderate value in increasing public appreciation of the resource and may lead to reduced degradation of trail traces and facilities.

Protection of WSAs and maintenance of wilderness characteristics would have no adverse effects and negligible benefits for recreation by sustaining primitive and unobtrusive recreation and preventing the encroachment of unauthorized and inappropriate activities that could degrade the natural character of these special areas.

Legal protection for the natural landscape of the (proposed) Upper Pit River Canyon and Lower Horse Creek WSR segments would have negligible benefits because they are already protected by the WSA status of the area; however, WSR protection could become very significant if the area is ultimately denied wilderness status. Again, benefits may accrue to both these areas by closing them to mineral materials (sand and gravel) removal, and prohibiting or restricting leasable and locatable mineral activities should these areas be denied wilderness status. The situation is different for the Lower Pit River Canyon, where moderate to major recreational benefits would accrue from protection afforded by WSR designation. Restricting or prohibiting the use of OHVs in all three river segments would have no effect on recreation because they are inaccessible to motorized travel.

### 4.10.5 Analysis of the Preferred Alternative

Benefits for recreation from management actions and protection afforded by CRMAs, SRMAs, NRHP sites, interpretive sites, and one cultural ACEC (1,400 acres) would apply on 198,000 acres to preserve cultural resources for public appreciation and archaeological investigation by present and future generations. The formal protection of cultural resources, archaeological interpretation, and public education would be substantially increased over present management. This would have moderate benefits. Three interpretive sites would be developed. This would have minor benefits.

Establishing cultural ACECs and restricting OHVs to existing routes are not expected to have significant effects on recreational opportunities, since the management area is not heavily used for motorized cross-country travel because of its rough, rocky topography. There may be positive benefits from eliminating conflicts with non-motorized users and from the peaceful and thoughtful enjoyment of archaeological sites in the absence of OHVs.

VRM classifications under the Preferred Alternative provide strong protection for the existing landscape while permitting some alterations—providing projects affecting the natural landscape meet the VRM objectives for the area. Specific beneficial effects from VRM decisions for the Preferred Alternative include protecting natural landscapes for a total of 16 miles in two WSR corridors with ‘wild’ designations and one 2.5-mile WSR segment with a ‘scenic’ designation. ACECs, historic trails, and some vista points (a total of 29,171 acres) also receive high-level VRM protection under this alternative. The Preferred Alternative would provide the greatest level of visual protection.

Mineral leasing NSO stipulations would decrease significantly to (10,612) and apply to ACECs/RNAs outside of WSAs only. Locatable mineral withdrawals would apply to ACECs/RNAs and WSRs (32,993). This alternative would have a moderate beneficial effect by retaining the natural character of the sensitive landscapes and WSR corridors.

Renewable energy and saleable minerals on WSRs, WSAs, and ACECs/RNAs outside of WSAs would be ‘Closed’ to development on 67,660 acres. Overall, minor adverse effects would occur and diminish the recreation experiences that rely on the natural landscape and key settings for recreation. Mitigation and protection measures would provide buffers, and development would generally be site specific.

The Madeline disposal modification (retaining some land slated for disposal in order to preserve sage-grouse habitat) would have negligible to minor benefits for recreation, since parcels are small and have limited recreational potential (many are inaccessible, being surrounded by private land. If the parcels were sold, it would result in negligible adverse effects for recreation public access, as most of the parcels are surrounded by private land.

In this alternative the conservation pilot project for lands would have negligible beneficial effects on recreation opportunities such as hunting and hiking. The public would only receive access to (500) acres of private land in exchange for (800) acres of public land that would go into private ownership (free of charge), with no monetary value to the U.S.. Benefits to recreation would include insignificant amount (500) acres of additional public access (easement) to private lands. Minor to moderate adverse effects would include: loss of (800) acres of public land, loss of sale revenues to the U.S., loss of monetary value to the counties through the payment in-lieu of taxes program, and loss of monetary effects through rural tourism, as a portion of the payments in lieu of taxes are identified for use in recreation oriented projects that benefit tourism.

Recreation opportunity spectrum for the Preferred Alternative would allocate a ‘Primitive’ designation for 11% of the management area (centered on WSAs, the least-developed areas). Most of the management area (67%) is divided between SPNM and ‘Semi-primitive motorized’ (SPM) designations. This mix of motorized and non-motorized recreation activities provide diversified opportunities for the recreation base on public lands.

A total of 80 acres would have ‘Open’ travel designations within the Cinder Cone OHV management area for the purpose of cross-country recreational driving. Less than 1% of the management area would be ‘Closed’ to OHVs under this alternative. Only seven miles of dirt roads are affected in areas with permanent OHV closures. On the remaining 897 miles (99% of the management area) OHVs would be ‘Limited to Existing or Designated Routes’. There would be negligible overall adverse effects on motorized public access and major adverse effects on recreational driving.

However, seasonal road closures will impose additional, temporary limitations on vehicular access and recreation. On the other hand, there would be minor overall benefits for non-motorized recreation. The intention would be to gradually develop a fully designated route system. This would eliminate ambiguities (for BLM staff and the public) and reduce user conflicts.

It would also establish clearly identified routes and route designations and make travel management regulations enforceable.

Trail development under the Preferred Alternative calls for 25.5 miles of new trails with non-motorized designations in high-use areas (such as the Infernal Caverns/Rocky Prairie SRMA). Trails tend to connect residents and visitors with nature, are convenient for outdoor exercise, and can foster community spirit. Because trails would be developed in high-use areas, they would serve a large proportion of the public and disperse recreation over a larger area, thereby reducing overcrowding and user conflicts.

Six new ACECs (totaling 29,171 acres) would be designated, in addition to the existing Ash Valley and Baker Cyprus RNA. This would have moderate benefits for recreation by focusing management on the outstanding or unique resources for which these ACECs are proposed, thus protecting the natural setting so important for high-quality recreational experiences. However, ACECs may also have adverse effects by reducing dispersed recreation. This is because restrictions imposed to protect ACEC values (shown in Table 2.11-7) discourage or eliminate certain kinds of recreation and may concentrate use elsewhere.

### ***Summary of Effects of the Preferred Alternative***

The Preferred Alternative would result in negligible to minor adverse effects on recreation, and moderate beneficial impacts. Less than 1% of the management area would be 'Closed' to OHVs and 'Open' OHV designations would apply on 80 acres. Otherwise, OHVs will be 'Limited to Existing or Designated Roads and Trails'. This is a major reduction for OHV recreation compared to the current 441,077 acres of unrestricted travel permitted. However, adverse effects on motorized access to public lands would be negligible. OHV limitations would help reduce user conflicts, and conserve soils, water quality, and natural settings thereby providing high quality recreational experiences.

Three OHV management areas would be established for benefit of OHV enthusiasts. Trails would be built in high-use areas, where they would benefit the greatest number of users or would connect communities via a convenient recreational trail system. Restrictions on mineral development in ACECs, WSRs, and WSAs would protect and enhance fragile and unique resources. Natural settings for many recreational activities would be somewhat better protected because of WSR designations. Similarly, restrictions on mineral activities would lend additional protection for the landscape and recreational settings in SRMAs. Designation of SRMAs would improve recreational experiences by focusing management to meet specific needs in areas heavily used for recreation. This is designed to reduce user conflicts and limit activities that detract from the recreational experience or compromise public safety.

### **4.10.6 Cumulative Effects**

The effects of most activities associated with BLM resource programs are temporary or limited to the area in which the activity occurs. Cumulative adverse effects from management under the Preferred Alternative, in combination with land-use decisions and actions on adjacent USDA Forest Service and private lands, should not be significant. Anticipated effects from actions on adjacent lands would generally result in incremental adverse effects on recreation.

Trail development on adjacent lands would complement similar efforts on BLM-administered lands. OHVs would be 'Limited to Existing or Designated Routes'. This would have substantial benefits for most forms of recreation by effectively dealing with the (increasingly) destructive influence of off-road driving, thereby preserving natural settings (and natural resources), minimizing user conflicts, and preserving high-quality recreation for the majority of users.

An important and effective proposed action is: the proportion of ‘Primitive’ and SPM ROS designations, which allows a good mix of vehicle use as well as non-motorized recreation activities, and the establishment of six new ACECs for research, recreation, and protection of endangered species. A steadily increasing demand for convenient, quality recreational experiences is accommodated through designation of SRMAs and WSRs, trail development, and limitations on OHV use. Overall, the Preferred Alternative would have significant beneficial effects for recreation and natural settings.

### **4.10.7 Mitigation Measures**

There would be two major adverse effects on recreation requiring mitigation under the Preferred Alternative. Management would limit OHVs to existing or designated roads and trails. While this would impose negligible adverse effects on motorized public access it would have minor to moderate adverse effects on recreational driving (by eliminating off-road travel). However, there would be some mitigation by designating three special OHV management areas (Cinder Cone, Barnes Grade, and the Fall River Trail) for motorized travel.

Where livestock grazing would approach moderate adverse effects on recreational fisheries and associated riparian systems, exclosures, reduction in numbers, changes in the grazing system or season of use would be considered to enhance long-term benefits for soils, water, vegetation (including special status plants), wildlife, culture resources, and recreational activities such as hunting, fishing, and wildlife-viewing.

### **4.10.8 Unavoidable Adverse Impacts**

No unavoidable adverse impacts are anticipated.

### **4.10.9 Short-Term Uses Versus Long-Term Productivity**

Short-term uses include area fencing to protect archaeological sites, sensitive vegetation, and wildlife habitats. Temporary road and/or area closures would apply seasonally or for fire-fighting, fuel management, or forestry actions. However, these actions would enhance the long-term health and productivity of soils, water, vegetation, wildlife, and cultural resources—and enhance hunting, fishing, wildlife-viewing, cultural resource appreciation and other recreation. Management will protect and enhance resources, provide high-quality recreation, promote rural tourism, thereby generating a beneficial impact to recreation resources.

### **4.10.10 Irreversible and Irretrievable Actions**

There are no irreversible or irretrievable actions.

## **4.11 Potential Effects on Social Conditions**

This section describes the potential impacts on social conditions as a result of implementing proposed management actions under the Preferred Alternative.

### **4.11.1 Methodology and Assumptions**

The analysis of effects on social conditions considers changes in the following issue areas:

- access to resources (e.g., recreation),
- quality of life,
- social relationships and community organization,
- community resiliency,
- attitudes and values, and
- sense of place (e.g., visual resources).

We assumed that management actions that could directly or indirectly affect recreational opportunities, tourism, property, aesthetics, and safety could affect communities in the AFO area.

### **4.11.2 Incomplete or Unavailable Information**

Adequate information is available to analyze the effects on social conditions at the RMP level.

### **4.11.3 Analysis of the Preferred Alternative**

The Preferred Alternative would result in negligible to minor adverse impacts, and minor to moderate beneficial impacts to current social conditions. Beneficial effects include increased recreational opportunities and protection of resources that are of critical concern, native to the area, or are valuable to rural lifestyles. Adverse effects generally would be short-term or temporary, except for permanent closure of facilities (e.g., roads) or access restrictions to recreation.

Management actions that result in full fire suppression in the short term would benefit residents and landowners who would otherwise experience the following:

- poor air quality and increased smoke,
- threats of fire to homes and businesses,
- endangerment of life from encroaching wildfires, and
- other impacts of fire.

Management actions involving prescribed burning might result in the adverse effects of fire, such as

- poor air quality,
- potential loss of access for firewood cutting, and
- decreased opportunity for residents and tourists to enjoy areas that are in or near wilderness study areas and are being treated by prescribed burning.

Use of heavy equipment and vehicles on local roads, such as detour roads and in staging areas close to communities, could temporarily disrupt daily commute patterns during both prescribed burning and fire suppression.

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Over the long term, the fuels reduction program would result in more fire-safe communities and decreased risk of wildfire and its impacts, particularly in the WUI.

Management actions to remediate soils that do not meet the land health standards could result in closing or rehabilitating some roads. Use of heavy equipment and vehicles on local roads and in staging areas close to communities could temporarily disrupt daily commute patterns during these activities.

Temporary closures during soil remediation management actions could limit access for fire suppression vehicles and could remove features that act as fuel breaks. Given the relatively small acreage that could be affected, such effects are considered minor.

Management actions that encourage community residents to participate in educational events, such as treating noxious weeds and managing plant communities, would increase knowledge and appreciation of plants and would benefit for the community.

Management actions to designate and protect native plant communities and woodlands could restrict access to public lands, having adverse social effects from decreased recreational opportunities. In the long term, all segments of society would benefit from preserving native plants for future generations to enjoy.

Management actions that aesthetically change communities or nearby areas (e.g., fence building, prescribed burning [resulting in the loss of the original viewshed], and protective designation of native plant communities) could benefit or harm a community's sense of place.

Management actions that permit public use along streams and water bodies would have the following benefits:

- increasing recreational resources,
- increased opportunities for water activities (e.g., fishing) for residents and tourists and for enhancing the rural lifestyle.

Land acquisition or disposal might result in the closing or rehabilitating of some roads, which could harm communities by temporarily disrupting daily commute patterns or creating permanent detour roads. Land and realty actions might also provide access to previously inaccessible BLM-administered lands and increased opportunities to use these lands.

Designating a ROS would permit a diverse range of recreational opportunities on BLM-administered lands. Improvements to recreational facilities (e.g., campground improvements, trail development and maintenance, and interpretive site development) would enhance opportunities for local communities and visitors. Management actions designating OHV use areas would optimize OHV recreational opportunities for communities and visitors in suitable areas and could enhance opportunities for other recreation activities (e.g., fishing and hunting) in other areas.

Management actions that would protect ACECs, historic national trails, WSAs, and WSRs would benefit the community and the region by creating public awareness of the natural values of these areas and ensuring the protection of these resources for future generations.

The effects of resource management actions on current social conditions are more beneficial than adverse. Beneficial effects include increased recreational opportunities and protection of resources that are of critical concern, native to the area, or are valuable to rural lifestyles. Adverse effects generally would be short term or temporary, except for permanent closure of facilities (e.g., roads) or access restrictions to recreation.

#### **4.11.4 Cumulative Effects**

The proposed management actions would not result in any adverse cumulative impacts on local or regional social conditions. Local communities would continue to benefit from multiple-use management of public lands. Overall, the proposed management on BLM-administered lands would not substantially change extractive and other resource uses and would result in better resource protection. Federally and state-managed lands make up over 63% of the land area in the AFO, with BLM-administered lands comprising 12%. Local communities rely on these public lands to maintain their economic livelihood and sense of place.

In addition to the social benefits accruing from extractive uses of natural resources (grazing, farming, timber, and mining), recreation and wildlife uses are becoming increasingly valuable to the local economy. With increased tourism, protection of natural resources and open space values that attract visitors to the area would become increasingly important as local and regional populations continue to grow.

Increased growth in the field office area would also result in converting open space to residential areas. Public lands would play an important role in maintaining the rural character and quality of life that are often responsible for attracting new residents to the area.

The proposed management actions were developed in anticipation of increasing populations and use of public lands. Ecosystems would be enhanced by protecting watersheds, viewsheds, and other natural values. State and federal agencies can continue to manage lands for uses that are compatible with the goals for economic development and rural lifestyle expressed in the land use plans for counties in the field office area. These agencies can continue to coordinate with local governments in the planning process and in managing public lands for multiple uses.

#### **4.11.5 Mitigation Measures**

None.

#### **4.11.6 Unavoidable Adverse Impacts**

None.

#### **4.11.7 Short-Term Uses Versus Long-Term Productivity**

None.

#### **4.11.8 Irreversible and Irretrievable Actions**

None.

## **4.12 Potential Effects on Soil Resources**

This section describes the potential impacts on soils as a result of implementing proposed management actions under the Preferred Alternative.

### **4.12.1 Methodology and Assumptions**

The following discussion addresses key soil concepts and parameters that are fundamental to understanding the discussions of existing conditions and effects for soils.

The main indicators for evaluating the overall condition of soils are soil/site stability and hydrologic function. These indicators are part of BLM's Land Health Assessment (LHA) and are used to assess soil health in the context of BLM's S&Gs. Soil/site stability ratings reflect the capacity of a representative site to limit redistribution and loss of soils (including nutrients and organic matter) by wind and water. Hydrologic function reflects the capacity of the site to do the following:

- capture, store, and safely release water from rainfall, runoff, and snowmelt (where relevant);
- resist a reduction in this capacity; and
- recover this capacity following degradation.

The LHA database is maintained in the AFO. The LHA provides 12 indicators that are used to rank soil/site stability and hydrologic function into five categories:

1. slight to no deviation from what would be expected on a reference site,
2. slight to moderate deviation,
3. moderate deviation,
4. moderate to extreme deviation, and
5. extreme deviation.

For consistency with other assessments, ratings 1 and 2 are considered to be in 'Properly Functioning Condition' (PFC), rating 3 is considered 'Functioning at Risk,' and ratings 4 and 5 are considered nonfunctional.

The 12 LHA indicators are listed below:

- rills;
- water flow patterns;
- pedestals and terracettes;
- bare ground;
- gullies;
- wind scour, blowout/depositional;
- litter movement;
- resistance to erosion;
- soil loss or degradation;
- plant community composition/distribution relative to infiltration and runoff;
- compaction; and
- litter amount.



The following processes influence these indicators.

- **Soil compaction** results from vehicles, construction equipment, people, animals, and livestock traveling over trails or land. Compaction can lessen the amount of precipitation that can infiltrate into soil and increase runoff, erosion, and sedimentation—in turn decreasing soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.
- **Interception of precipitation** results when precipitation falls on vegetation. When vegetation is removed, precipitation falls directly on the soil, increasing surface erosion and sedimentation, and decreasing the amount of time between initial precipitation arrival and peak surface runoff—in turn decreasing soil/site stability and hydrologic function.
- **Infiltration** is the process of precipitation entering and traveling through soil. Infiltration reduces the peak runoff during precipitation events by extending the period of runoff after a precipitation event. Infiltration also filters precipitation and reduces erosion and sedimentation. Most importantly, infiltration provides for moisture availability, which allows for the continued development of the soil profile. If infiltration is reduced, runoff and erosion will increase and soil/site stability and hydrologic function—as well as soil moisture availability, soil productivity, and plant vigor and diversity—will decrease.
- **Runoff** can affect the amount of erosion and sedimentation, as well as flooding—both onsite and offsite. If runoff is increased, all of these effects can increase and soil/site stability and hydrologic function—as well as soil moisture availability, soil productivity, and plant vigor and diversity—will decrease.
- **Erosion and sedimentation** affect soil/site stability and hydrologic function. Erosion and sedimentation can destabilize the surface and subsurface cohesion of the soil. Increased sediment entering water bodies' increases turbidity, increases width-to-depth ratios, and consequently increases temperature and dissolved oxygen (DO) saturation levels, and creates an adverse habitat for aquatic animals and plants.

The management actions that could lead to the effects described earlier includes the following on-the-ground activities:

- **Ground disturbance** can result from many activities:
  - archaeological activities;
  - mechanical and hand treatments of vegetation;
  - livestock trampling;
  - energy and minerals development;
  - harvesting of timber;
  - road building;
  - recreation activities;
  - facilities development;
  - water development; and
  - construction of structures such as buildings, fences, and exclosures.

If not properly managed, ground disturbance can lead to erosion and sedimentation, with associated degradations in soil/site stability and hydrologic function, as well as soil productivity and plant vigor and diversity.

- ***Instream structures*** present a form of streambed and streambank disturbance that can mobilize sediment and weaken the soil structure. Because of the direct mechanism for exposure to such contaminants, instream work is of particular concern. Long-term effects would be related to increases or decreases in flows and sediment transport, with associated effects on geomorphology and soil/site stability and hydrologic function—as well as riparian function and instream habitat.
- ***Livestock distribution*** can increase or decrease the effect of livestock, depending on their location and density. If livestock are concentrated in small areas or along fencelines, soil disturbance from trampling would be greater than in some other areas, with associated effects related to soil disturbance and compaction. Soil organic matter, root structure, and soil biota can all be compromised. In particular, Vertisols (which exhibit shrink-swell characteristics) are at a high risk for soil degradation. Concentration of livestock and wild horses in riparian areas can destroy streambanks. Such concentration is possible where there are no alternative water supplies or where exclosures are not used.
- ***Altered drainage patterns*** could result from such ground disturbance as building roads, harvesting timber, and installing instream structures. Altered drainage patterns can increase erosion and sedimentation and, in turn, decrease soil productivity.
- ***Increased erosion and sedimentation from roads*** can occur when improperly maintained drainages near roads concentrate runoff from roads and cause erosion and sedimentation. Erosion and sedimentation can also impair soil productivity and stability by removing soil organic matter and other stabilizing components of the soil profile.
- ***Vehicles*** can cause erosion and sedimentation. If vehicles are driven on soils, they compact the soil. If they are driven irresponsibly off roads, they can accelerate erosion and sedimentation and, in turn, decrease soil productivity.
- ***Visitation to interpretive centers*** increases ground-disturbing activities and soil compaction from foot and vehicle traffic in soils beneath and immediately next to interpretive centers and associated trails. Areas of greater disturbance might experience reduced soil productivity.
- ***BLM's ability to manage for the benefit of soils*** could be restricted or improved, depending on which management actions are implemented. Different treatments offer BLM differing levels of control to manage watersheds for the greatest environmental benefit of soils.
- ***Projects could be improperly located*** if visual and soil considerations are not properly balanced. If projects are not sited properly, erosion and sedimentation can increase.

We have obtained data for analysis through BLM staff knowledge, and LHA described above. Assessments and data used to compare soil condition with the LHA indicators are maintained in several databases and linked to geographic information system (GIS) themes.

The analysis boundary for considering the effects on soils includes all lands under the jurisdiction of BLM's AFO. (For analyzing cumulative impacts, we considered all lands in the AFO area's watersheds, as well as any upland conditions to which the project alternatives could contribute.)

We based our qualitative analysis of effects to soils on a review of soil data for the AFO and on professional judgment. Our analysis focused on the potential of proposed management actions to degrade soils. In analyzing effects, we assumed the following:

- Recreation use of the field office area would continue to increase.
- BLM policies, including the S&Gs, would be achieved and applied as suitable.

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- Adverse effects on soils throughout the AFO area would be reduced by management practices and adherence to Standard 1 of the S&Gs (see below).
- No net loss of soil productivity or fertility would result. If soil productivity were decreased in one area, the decrease would be offset by offsite restoration or mitigation.
- BLM will conform to the latest California Department of Transportation and Uniform Building Code building code standards, county general plan seismic safety standards, county grading ordinances, and National Pollutant Discharge Elimination System requirements.
- Effects are quantified by their relationship to Standard 1 (see below). Under the management actions, Standard 1 would either be readily achieved or not readily achieved. Furthermore, achieving Standard 1 would require either (1) varying degrees of effort (e.g., “the least,” “a lesser,” “a greater,” or “the greatest” amount of effort), where effort is defined as project-specific mitigation or additional time to reach Standard 1 following project implementation. The term “beneficial” denotes that implementing management actions would increase soil/site stability and hydrologic function. The term “adverse” denotes that implementing management actions would decrease soil/site stability and hydrologic function.

The most applicable criteria for determining the extent of effects on soils are listed below. These criteria are set forth in Standard 1 of the S&Gs, which states “Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, and landform, and exhibit functional biological, chemical, and physical characteristics.”

This statement means that “Precipitation is able to enter the soil surface and move through the soil profile at a rate appropriate to soil type, climate, and landform; the soil is adequately protected against human-caused wind or water erosion; and the soil fertility is maintained at, or improved to, the appropriate level.”

The criteria to meet the standard include the following:

- Ground cover (vegetation, litter, and other types of ground cover such as rock fragments) is sufficient to protect sites from accelerated erosion.
- Evidence of wind and water erosion, such as rills and gullies, pedestaling, scour or sheet erosion, and deposition of dunes, is either absent or, if present, does not exceed what is natural for the site.
- Vegetation is vigorous, diverse in species composition and age class, and reflects the potential natural vegetation or desired plant community for the site.

Implicit in all of the proposed management actions is BLM’s intention to implement management practices to meet this standard or make significant progress toward meeting this standard. As a result, the main findings will be the time it takes to reach land health goals (or how much effort is required to reach land health goals) rather than whether the action would prevent meeting these goals.

### 4.12.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on soils at the RMP level.

### 4.12.3 Analysis

This analysis defined the levels of effects on soil resources as follows:

**Negligible:** The effects on soil productivity or fertility would be at or below the level of detection.

**Minor:** The effects on soil productivity or fertility would be small, as would the area affected. If mitigation is needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

**Moderate:** The effect on soil productivity or fertility would be readily apparent and would change the soil character over a relatively wide area. Mitigating measures would probably be needed to offset adverse effects and would likely succeed.

**Major:** The effect on soil productivity or fertility would be readily apparent and long term and would substantially change the character of the soils over a large area. Extensive mitigating measures to offset adverse effects would be needed, and their success could not be guaranteed.

**Short Term:** The effect is expected to occur within 1 to 5 years of implementing the action.

**Long Term:** The effect that would occur after the first 5 years of implementation but within the life of the RMP (projected to be 20 years).

### 4.12.4 Impacts

Major soil-disturbing activities that are expected to occur include the following:

- Wild horse and livestock grazing,
- recreation and OHV use,
- fire use and fuels treatments,
- road building and maintenance, and
- juniper treatment and timber harvest.

As a result of soil-disturbing activities in areas having soils with limitations, adverse impacts include vegetation and soil loss, soil erosion and compaction, decreased infiltration, and increased runoff.

Fire use and fuels management would have short-term adverse impacts to soils through prescribed burning or fuels reduction. Prescribed burning and fuels reduction would increase erosion, runoff, and compaction rates through vegetation loss, use of heavy machinery, and temporary hydrophobic soil conditions following fires. Other post-fire erosion and compaction (i.e., a short-term, direct, adverse impact) would result from fire such suppression activities as the digging of firelines and the bulldozing of roads.

Over the long term, however, these fire management activities would reintroduce the natural fire return interval, thereby decreasing or eliminating the occurrence of catastrophic rangeland fires and promoting more productive rangelands with less soil degradation. Reducing catastrophic fires would limit the aggressive fire suppression needed for wildfire control, thereby reducing indirect impacts to soil and water resources. Moreover, the vegetation component that would become established over the short and long term would improve soil structure and decrease erosion, compaction, and runoff rates. Fire could benefit soil fertility by increasing nutrient cycling. High-intensity wildland fires in localized places could sterilize soil and reduce overall productivity, but overall adverse effects would be minor.

Grazing and wild horse uses in areas with sensitive soils could degrade soils in both the short and long term through ongoing soil compaction, erosion, sedimentation, and degrading of stream channel condition (Fleischner 1994). Conversely, making areas unavailable to grazing would result in long-term benefits to soils because erosion, sedimentation, and increased runoff from direct trampling would be avoided.

Soil compaction or erosion or both would occur in areas where livestock concentrate (e.g., watering areas, salt licks, fencelines, and corrals) and vegetation has been reduced or removed. Other livestock developments could increase such impacts. Some of these developments might mitigate more widespread effects to soils by concentrating livestock use in specific areas. Livestock use would cause adverse or beneficial impacts to soil fertility and production. The nature of the effects would depend on changes in nutrient cycling (e.g., reduced litter accumulation, incorporating manure), seedbed characteristics, abundance and type of soil biota or soil biological crusts, and soil moisture. Overall, livestock use would result in short- and long-term minor to moderate effects to soils.

Recreation uses that could degrade soils include the following:

- establishing corridors along existing roads and trails wide enough to allow for road maintenance,
- vehicle pullouts and camping, and
- developing new roads and trails in ‘Roaded natural’ and SPM areas—as well as other scenic byways, vistas, or driving loops.

These actions could degrade soils in the short term by increasing erosion, sedimentation, and runoff from the ground disturbance of road building and from the use of vehicles in these areas (Snyder and others 1976).

The AFO would designate the 80-acre Cinder Cone OHV Management Area as ‘Open’ to OHV use. In that area, cross-country use could damage soils by soil exposure and erosion and loss of vegetation. The ‘Open’ designation is limited to a small area of sandy soil with some historical OHV activities, and no other soil impacts are expected.

Recreation uses that could benefit soils include closing existing roads in response to harmful ecological impacts and emergency vehicle closures where OHVs are determined to be disturbing or threatening to disturb soils. All of these actions would reduce soil disturbance in areas of existing or future soil degradation, benefiting soils and speeding recovery to PFC in those areas.

Management of the existing Ash Valley ACEC and Baker Cypress Natural Area would restrict OHV use and benefit soils. Managing WSAs to retain wilderness characteristics would generally reduce erosion, soil compaction, and sedimentation, thereby benefiting soils.

Forestry uses and juniper treatment include hand and mechanical harvesting of timber and treatment of juniper, and managing forestlands using a mix of silvicultural practices. Ground disturbance from these activities, through the use of heavy wheeled or tracked vehicles, could disturb the soil in the short and long term, decreasing infiltration and increasing runoff, erosion, sedimentation, and soil compaction (Riekerk 1989). Timber operations and juniper treatments would be required to implement measures to protect soils.

Direct effects to soils from road maintenance and use would include road edge disturbance, isolated erosion, and compaction. The effects on soils from soil displacement and dust production would be local, minor, and long-term. Building and maintaining trails, as well as recreational use, would involve some soil loss, compaction, and erosion, resulting in site-specific negligible to minor long-term adverse impacts to soils.

Weed control by herbicides or mechanical means would cause negligible to minor short-term disturbance to soil chemistry, structure, productivity, and abundance through herbicide applications, equipment disturbance and compaction, and wind erosion.

The long-term benefits of weed control and a restored sagebrush steppe community would include stabilized soils and improved or restored natural fertility, productivity, and function. Such benefits would be long term and moderate.

Many of the actions under resource programs would protect soils, such as use of exclosures and closing areas to certain uses. Of these, management actions for soil and water resources are most explicitly aimed at maintaining and improving progress toward PFC and would most benefit soils. Exclosures and closing areas for wildlife and archeological concerns would offer extended benefits to soils as a byproduct.

Similarly, special management areas with use restrictions such as ACECs and WSAs would limit effects to soils. Other resource programs would involve uses that could degrade soils through ongoing disturbance. Of most concern would be actions related to livestock grazing, wild horses, new road building, and OHV use because of their potential for widespread soil disturbance.

Actions with similar but smaller adverse effects are related to forestry, issuing ROWs, and mineral extraction because of the smaller areas those actions would disturb. Fire and fuels management has a great potential to affect soils, and actions that lead to a return of more natural fire cycles would greatly benefit soils.

All activities that could disturb soils would employ BMPs to further reduce the potential for adverse effects. Additionally, these activities would not result in a net loss of soil productivity because an equivalent improvement in soil productivity would be required elsewhere when an activity degrades soil productivity.

### **4.12.5 Preferred Alternative**

The Preferred Alternative would result in minor adverse impacts and moderate beneficial impacts to soil resources.

Under the Preferred Alternative, the potential for catastrophic fire would also be reduced by the large acreage proposed for the full range of fire suppression options (486,047 acres) and the small acreage proposed for WFU. Bias toward AMR in place of WFU would generate fewer benefits than if the bias were toward WFU. The planting of 36 miles of greenstripping to protect at-risk native plant communities would also help protect against catastrophic fires.

The area of fuels treatment (10,000 acres per year for prescribed fire, 10,000 acres per year for mechanical treatment) would help promote the natural fire regime and more productive rangelands with less soil degradation. Over the life of the RMP, 200,000 acres (40% of the field office area) could be mechanically treated or treated by prescribed fire. Biological and chemical treatments on 1,250 and 500 acres per year, respectively, would be intensely managed, and any adverse effects would be minor and short-term. Combined adverse effects over the life of the RMP would be major but short-term. Beneficial long-term effects would outweigh any harmful effects.

Mechanical treatment of juniper on 80,000 acres, harvesting timber on 12,000 acres, and reforestation on 8,000 acres could result in major short-term disturbance of soils, such as decreased infiltration and increased erosion, sedimentation, runoff, and soil compaction. As a result, soil/site stability and soil productivity would decrease.

Timber and juniper operations would be designed to protect soils. In addition, over the long term, artificial regeneration and establishing the natural sagebrush-steppe community would increase vegetation cover, with corresponding benefits to soil stability over a major area.

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Hand treatments of 6,800 acres (both juniper and timber) would benefit soils by reducing soil disturbance and helping restore the natural vegetation community.

Felling juniper and leaving it in place would contribute to erosion control. Prescribed burning on 200,000 acres might increase erosion and runoff on a moderately short-term basis. Long-term benefits would outweigh any adverse effects. Fuelwood cutting on 15,000 acres would result in minor and short-term adverse effects to soils, but the long-term benefits to the soil from removing juniper would compensate for the short-term harm.

Improperly managed biological treatment (e.g., overgrazing by goats) could compact soil and remove too much vegetation. Over the life of the plan, biological and chemical treatments on 5,000 and 13,000 acres, respectively, would be intensely managed, and any adverse effects would be minor and short-term. Benefits to soils would be moderate with both short- and long-term effects through enhanced recovery of the natural vegetation community.

Expanding existing utility ROWs up to 500 feet under the Preferred Alternative would introduce the potential for soil degradation within those corridors as they are developed. By designating corridors for transportation and utilities, BLM would select the preferred areas for placing new projects. This designation would benefit soils by promoting use of certain areas for more than one project. This designation would also reduce the opportunities for projects to be implemented in multiple areas, thus reducing the area subject to soil disturbance.

Maintaining 28 miles of roads and building 10 miles of permanent and 50 miles of temporary roads would result in minor disturbance to soils throughout the field office area. All adverse effects to soils would be reduced by using BMPs or would be mitigated for offsite. The seasonal gating or closing 81 miles of roads would have moderate, long-term benefits to soils by restricting vehicle access to large areas during wet conditions.

OHV use would be largely 'Limited to Existing or Designated Routes', which would reduce disturbance to certain roads and on soils in areas suitable for cross-country travel. BLM would close 4,625 acres to OHV use for cultural, riparian, and wildlife concerns, providing more soil protection. About 119,000 acres would have ROS designations of 'Primitive' or SPNM, which would have major short- and long-term benefits to soils where motor vehicle use would be eliminated.

Developing 8 to 10 interpretive sites, 5 to 10 parking areas, and up to 25.5 miles of new trails could result in minor short-term disturbance from construction and minor long-term disturbance from the use of these areas.

BLM would designate 29,171 acres as ACECs. This designation would better protect soils and would result in moderate short- and long-term benefits to soil health.

The following other actions would reduce soil disturbance and benefit soils:

- fencing in enclosures all spring areas that are not in properly functioning condition,
- building new permanent enclosures on 2,950 acres for cultural, wildlife, and riparian concerns, and
- constructing temporary fencing enclosures on 300 acres of quaking aspen to add extended protection to soils in those areas.

Twenty-five miles of bioengineering, such as felled juniper placement, along perennial, intermittent, and ephemeral streams would stabilize soils in areas along stream and drainage banks and also trap excess sediment and keep it from being transported from upland soils.

Bioengineering in drainages would cover relatively small areas but would have both short- and long-term benefits, especially to soil stability and productivity in riparian areas. Further bioengineering, such as juniper scattering on 200 acres of upland soils would reduce upland soil erosion and have scattered short- and long-term benefits to soils. Seventy-five other water developments, mainly for wildlife enhancement and livestock, would be built over the life of the RMP. These projects would benefit soils in the long term by reducing concentration around existing developments. The above actions combined would moderately benefit soils over the short and long terms.

### 4.12.6 Cumulative Effects

Cumulative effects are mainly expected where upland soils on BLM-administered lands do not meet land health standards. In these areas, any management action with potential for interfering with the ability to meet land health standards or slowing progress toward meeting those standards would be considered to result in a cumulatively considerable impact.

In addition, land uses on areas surrounding BLM holdings could generate adverse effects to soils, which could be worsened by BLM actions that result in similar adverse effects. The following known activities outside the field office area could contribute to cumulative effects:

- conversing sagebrush and other habitats to agricultural or residential use,
- invasions of noxious weeds,
- juniper treatments,
- logging and road building,
- water use, and
- fire.

Cumulative effects are also expected outside the field office area where the following actions could disturb surfaces:

- recreation resources management;
- utilities, transportation, and telecommunications management; or
- any other management activity that involves road building.

In approving activities and implementing protective measures and management practices, BLM would consider these adjacent uses and the potential of its activities to worsen any adverse effects. Therefore, while some cumulatively considerable effects might result from BLM activities in combination with other land uses, such effects would not be significant.

### 4.12.7 Mitigation Measures

All resource uses with the potential to degrade soils would employ BMPs to reduce potential adverse effects. Where adverse effects cannot be avoided and where they would not naturally recover, BLM would mitigate them by providing improvement equal in value to the area disturbed elsewhere in the field office area.



#### **4.12.8 Unavoidable Adverse Impacts**

Resource uses of most concern would be those involved with livestock grazing, wild horses, new road construction, and OHV use, due to the potential for localized and widespread soil disturbance. Actions with similar but smaller adverse effects are related to forestry, issuing ROWs, and mineral extraction, because of the smaller areas that would be subject to disturbance from those actions. Fire and fuels management has a great potential to disturb soils, but the benefits of natural recovery of soils after fire and fuels uses would outweigh this effect.

#### **4.12.8 Short-Term Uses Versus Long-Term Productivity**

Short-term uses disturbing soils, such as vegetation and juniper treatments and fire use, would generate enhanced long-term productivity.

#### **4.12.9 Irreversible and Irretrievable Impacts**

Effects to soils such as building permanent roads or campgrounds would result in permanent soil compaction, soil structure modification, and vegetation removal that would be irreversible and irretrievable as long as such areas continue to be used.

## 4.13 Potential Effects on Special Designations – Areas of Critical Environmental Concern

### 4.13.1 Methodology and Assumptions

This section describes impacts on ACECs as a result of implementing proposed management actions under the Preferred Alternative. When assessing the effects of management actions for other resource programs on ACECs, the following assumptions were made:

- This RMP will not provide detailed direction for every aspect of ACEC management. Specific guidelines for each ACEC will be completed after the record of decision is signed. Guidelines will generally be more restrictive than those that apply to the surrounding area. The Old Growth Juniper ACEC, for example, would incorporate specific measures to protect old growth juniper. Up to six new ACECs may be designated, four of which would also be RNAs, if designated.
- The existing Baker Cypress Natural Area will become part of the proposed Timbered Crater ACEC when the ROD is signed. (See Chapter 2.17.)
- One of the most important aspects of ACEC management is the growth of recreation. A market study of northeastern California conducted in 2002 identified non-vehicular activities, such as day hiking, as very popular in the region; however vehicle-based activities such as auto-based site-seeing and recreational driving were also very popular. Use of OHVs is a well-established activity on the existing network of rough dirt roads, primarily for hunting access and back-country sight-seeing (see the travel management section.) The key management challenge is to provide adequate public access and quality motorized and non-motorized recreational experiences while avoiding user conflicts and protecting resources and the environment.
- All types of recreation are likely to increase over the 20-year planning period of this RMP. Demand will continue to increase from individuals and groups as local and neighboring counties (particularly Lassen, Modoc, Shasta, and Siskiyou Counties in California, and Washoe County, Nevada) continue to grow. Projected annual growth is 0.4% for Lassen County and 1.43% for Washoe County. Requests for special event and commercial recreation permits will increase as more clubs, community groups, commercial, and educational organizations come to rely on BLM-administered lands for easy access on a daily basis.
- Lands with ACEC potential have been adversely affected by livestock grazing for years; some are exhibiting a steady decline in resource quality and health.
- ACECs require special management. This would be phased in, starting with the most pressing problems in order to arrest, then reverse, resource damage. Implementation plans will be specifically developed for each new ACEC. Priority will focus on those that are most degraded and those that are closest to population centers.
- As much as possible, ACECs will be created and managed according to easily identifiable public land blocks, major topographical features, or major road boundaries in order to increase public awareness, understanding, and compliance with identified ACEC values and regulations.

### 4.13.2 Analysis

For the purpose of this analysis, effects on ACECs are considered *adverse* if they would introduce or perpetuate any impairment of resources or values that the ACEC is designed to protect. Conversely, effects are considered *beneficial* if they would introduce changes that support or strengthen public land resources and ACEC values.

**Negligible:** Changes in ACEC resources and values would occur. However, if measurable, they would have no perceptible influence on recreational opportunities.

**Minor:** Changes in ACEC resources and values would be measurable and perceptible, but highly localized.

**Moderate:** Effects on ACEC resources and values would be appreciable and easily perceptible, but somewhat localized.

**Major:** Effects on ACEC resources and values would be substantial, obvious, and widespread.

### 4.13.3 Incomplete or Unavailable Information

Adequate information is available to assess effects on ACEC resources and values at the RMP level.

### 4.13.4 Impacts Common to All Areas of Critical Environmental Concern

Management actions such as inventory, evaluation, and categorization of sites are not expected to affect ACEC resources, values, or recreational activities. Restrictions associated with ACEC management—such as area or road closures—would be site-specific and imposed only when required to preserve or enhance ACEC values and resources. These are expected to have uniformly beneficial effects on ACEC values and resources.

Fuel reduction and fire management activities are not expected to have adverse effects on ACECs beyond temporary and localized disruptions to public access from road closures during prescribed fire or other vegetation treatments.

Proposed guidelines for public access (i.e., OHV travel designations and seasonal restrictions), vegetation restoration, and VRM classifications would provide protection for old-growth western juniper woodlands in specified areas (i.e., where this species was naturally prominent before Euro-American settlement.) Where old-growth juniper is an important feature of an ACEC, it will receive a higher level of protection than in other areas where old-growth juniper woodlands are also preserved.

Present management has allowed indiscriminate harvest of western juniper. Since old-growth juniper has much greater value for firewood as well as commercial uses, this has resulted in degradation of (naturally occurring) old-growth stands (see Chapter 3.19 and Chapter 4.18 Vegetation). Harvest and destruction of old-growth juniper has been suspended or reduced, pending signing of the ROD. However, illegal harvest still occurs and is expected to continue (at an indeterminate level) after adoption of this RMP. Increased public education (principally through interpretive signing), OHV limitations, and additional law enforcement may reduce degradation of old growth juniper woodlands.

Soil management includes various soil conservation, erosion control, and road maintenance practices. This may include closing and rehabilitating roads where sensitive resources are threatened. It also involves minimizing new road construction and may require some road realignment. These activities will, in certain locations or at certain times, disrupt route network connectivity, reduce recreational access and opportunities, and prevent the development of new routes—including some that would have reestablished previously existing route connectivity.

Road closures or relocations to enhance the quality of stream or lake water could also impair route network connectivity and would reduce OHV recreation within ACECs if new routes are not built to replace those that are closed.

However, road closures are often beneficial for hunting, fishing, hiking, and wildlife-viewing by reducing man-related disturbances, providing a more natural setting, and enhancing natural resources. Also, water quality closures are generally the same as required to protect soils; therefore, these closures are not expected to affect additional miles of road. The total impact of soil and water quality road closures cannot be determined until road-related site degradation is properly inventoried and identified. However, soil and water quality management actions cannot help but have overall positive benefits for ACEC values and resources.

Benefits will accrue to ACECs from measures designed to protect and restore riparian areas, wetlands, forests, and vegetation communities. Restoration of unhealthy vegetation and other conservation measures will enhance habitats and wildlife populations. Such management actions will generally improve natural and visual characteristics and will have minor to major long-term benefits for ACEC values and resources. Weed-control treatments are also expected to have minor short and long-term beneficial effects by restoring the native landscape and its natural diversity, and benefiting wildlife. Management actions for special status species could have moderate beneficial effects for ACECs by restricting or closing them to practices or activities that are harmful to these species. Actions would be based on monitoring and evaluation, and benefits would depend on the extent and details of closures and restrictions.

Management actions that protect the visual integrity of WSAs, scenic trail corridors, historic trails, proposed WSR segments, and SRMAs will have significant effects on ACEC values and activities. In conformity to BLM national policy, ACECs are designated VRM Class II; however, if created within a WSA, they are managed as Class I because of the wilderness interim management policy (IMP). An undeveloped, natural-appearing landscape is a very important component of the recreational appeal of these areas for hiking, hunting, wildlife-viewing, camping, trail-riding, and other recreational pursuits. For the most part, effects are indirect, but would have minor to major long-term benefits for ACECs by preserving their natural setting, thereby protecting associated values and resources.

Wild horse management is not expected to affect ACECs because actions do not include closures or restrictions that would affect recreation or economic opportunities, or alter the natural setting within any proposed ACEC.

Mineral and energy development would have negligible to non-existent adverse effects, on ACEC values as locatable and saleable minerals would be withdrawn, and leasables would have no surface occupancy stipulations. Also, some proposed ACECs are within WSAs and are therefore ‘Closed’ to saleable (decorative rock and cinders) and leasable (oil and gas) mineral exploration and development, and BLM will manage ACECs and WSAs to retain their primitive character. BLM also requires that new locatable mineral claims within a WSA must not cause surface disturbance. Currently, there is only one (locatable) mining operation in the field office (not in an ACEC or WSA) and no leasable sources have been developed.

Saleable minerals are the primary extraction activity and consist mostly of cinder removal and decorative rock collecting. Effects of these mineral activities are site-specific and, historically, have had minor to moderate adverse effects on six of the proposed ACEC sites from decorative rock collecting—primarily as a result of road and trail development. One other potential ACEC has had minor adverse effects from energy production activities.

Impacts on ACECs from forest management practices are expected to have some negligible adverse effects from timber harvesting. However, timber cutting within ACECs would be designed for the *sole* benefit of ACEC resources and values; therefore, adverse effects would be short-term.

Long-term ACEC benefits would justify timber harvest since enlightened forest management will ultimately improve forest health and support ACEC values. Timber harvest activities that focus on forest health and aesthetics would also be sensitive to site-specific issues associated with old growth or large trees. Such considerations could temporarily disrupt vehicular access or public use of the ACEC.

Livestock grazing occurs on most BLM-administered lands, including current and proposed ACECs. This use is expected to continue with minor to major, long-term adverse effects on proposed ACECs. Adverse effects would be most noticeable where ACECs (or ACEC/RNAs) are established for the primary purpose of protecting cultural or historical resources, or special-status plants. By way of mitigation, mandatory rest from grazing and exclusion of livestock to improve conditions around springs, and along streambanks and lake shores, would have minor to moderate beneficial effects by improving natural appearance, benefiting native plants, improving wildlife habitat, protecting cultural values, and minimizing visitor/livestock interaction.

Management actions identified for land acquisitions under this PRMP would have direct benefits for ACECs. Effects could be negligible to major, depending on the size and location of acquisitions. Land acquisitions would be available for recreational activities and would support ACEC values and resources. Permanent, legal public access would be provided on BLM-administered lands that have ACEC potential.

Road closures totaling 1 mile in distance (affecting a total of 680 acres) would be implemented in two ACECs to protect sensitive resources. This represents less than 1% of the total length of BLM-administered routes. One of the areas (Lava WSA) has been ‘Closed’ to OHVs for more than 25 years; thus preserving a population of sensitive plants in a vernal pool setting. Proposed road closures would have negligible to moderate beneficial effects on ACEC resources and values. Closures are inconsequential in terms of public access and would not affect recreational opportunities.

Development of new roads and trails in ROS-designated SPM areas would be limited to resource protection (primarily road or trail realignment) or would support new recreation opportunities by creating trails with non-motorized designations. Road or trail realignment, and judicious new road development, would be designed to protect resources and maintain natural settings by shunting motor vehicle traffic to routes that traverse less vulnerable areas. Overall, this management would have negligible benefits for ACECs.

Managing ACEC lands to provide opportunities for self-contained camping *in specified locations* would tend to concentrate use and increase the potential for litter, resource damage, and wildfires caused by irresponsible campers. Campers on BLM lands currently enjoy freedom and flexibility in their choice of areas and settings and are not limited to developed facilities.

Managing public lands as ‘Open’ to self-contained camping would have negligible beneficial effects, primarily by dispersing use.

Development of interpretive materials, displays, and presentations would enhance local resident and visitor understanding of natural history, cultural and historic values, and ACEC purposes. This would have minor benefits for ACECs by expanding public understanding and enjoyment of BLM-administered lands, resources, and values protected under this program. Such efforts may lead to increased rural tourism and contribute to diversification of the local economy; since ACECs provide an attractive destination and educational efforts would increase awareness and appreciation.

Management decisions and actions protecting WSAs and, therefore, affecting the ACECs proposed within them, would—assuming eventual designation of the WSA—have negligible benefits for ACEC resources and values and no adverse effects.

WSA management basically focuses on preventing unauthorized and unsuitable encroachment that could degrade the natural character of the environment. In either case, recreation would be primitive and non-mechanized (except on existing roads and ways) and an unaltered natural environment would be maintained. However, should any or all of the WSAs containing (proposed) ACECs be denied wilderness status and released from further study, existence of the ACEC would ensure continued protection of ACEC values and resources *within the bounds of the ACEC*. Under this scenario, major long-term benefits would result.

### 4.13.5 Analysis of the Preferred Alternative

Six new ACECs (a total of 29,171 acres) are proposed to protect and enhance landscapes for vulnerable resources—particularly historic trails, old growth juniper, cultural resources, unique geological features, continuity of wildlife habitats, and protection of sensitive plants and wildlife.

#### 4.13.5.1 Ash Valley ACEC/RNA

The Preferred Alternative would result in negligible adverse impacts, and moderate benefits to the existing Ash Valley ACEC (1,322 acres). Impacts would be the same as described in Impacts Common to All except additional benefits would result from requiring NSO restrictions to potential leasable mineral development. The use of appropriate management response for fire activities could contribute to beneficial impacts as natural fire regimes are returned.

#### 4.13.5.2 Baker Cypress Natural Area

The Preferred Alternative would result in minor adverse impacts, and moderate to major benefits to the existing Baker Cypress Natural Area (1,448 acres). Beneficial impacts would result from the use of appropriate management response for fire activities, as natural fire regimes are returned. It is also expected to accelerate Baker cypress reproduction as this species requires fire for adequate regeneration.

Additional benefits would result from the closure of all energy and mineral development, especially locatable minerals. OHV use would be 'Limited to Designated Routes', and impacts from travel activities would be negligible.

#### 4.13.5.3 Emigrant Trails ACEC

This alternative would result in minor adverse and moderate beneficial impacts, and would protect and provide interpretive information and recreational opportunities on 29 miles of historic trail remnants. It would encompass 1,750 acres of BLM-administered lands (in three locations) on portions of the historic Lassen, Applegate, and Yreka Trails. Protection would enhance trail-related recreation and visitor understanding and enjoyment of historic trails. Designation would also enhance and protect the natural setting, vegetation, and wildlife; and trail viewing opportunities.

Scenic qualities would be preserved under VRM Class I and II objectives. Timber harvest and woodcutting would remain closed.

Impacts from ROWs, OHV use, and mineral development would be negligible and NSO requirements would be implemented for leasable minerals.

Livestock grazing would have minor to moderate adverse effects throughout the ACEC. A greater emphasis would be placed on meeting land health standards and protecting sensitive resources from adverse grazing effects.

A ROS ‘Primitive’ classification would have moderate beneficial effects for protection of historic resources and natural settings.

### **4.13.5.4 Likely Tablelands/Yankee Jim/Fitzhugh Creek ACEC**

The Preferred Alternative would result in moderate adverse and moderate beneficial impacts to the Likely Tablelands/ Yankee Jim/Fitzhugh Creek ACEC area. Only the 1,400 acre Yankee Jim portion of the proposed ACEC would be designated as such. This area represents one of the most archaeologically important and sensitive areas in the AFO area.

Sites within this area currently have little protection from primary impact agents such as livestock and the illegal collection of artifacts. The ACEC designation is intended to reduce these impacts, so that the elements that make this a NRHP-eligible district will not be lost.

Minor to moderate long-term adverse impacts on recreation and ACEC resources and values may be expected. Mitigation would consist of exclosure fencing, plus other forms of protection to reduce impacts. A greater emphasis would be placed on meeting land health standards and protecting sensitive resources from adverse grazing effects.

OHVs would be ‘Limited to Designated Routes’ from April 16 through November 30 and ‘Closed’ from December 1 through April 15. Recreation and ACEC values that rely on a natural landscape would benefit from these restrictions. Seasonal road closure would help maintain soil stability, protect vegetation and cultural sites, and benefit wildlife.

The need for juniper treatment in this ACEC would be assessed and treatment initiated as required, with the primary object of enhancing ACEC resources and values. Where juniper treatment is conducted, short-term adverse effects would be negligible. Long-term benefits from juniper removal would be minor to moderate, depending on current site condition and potential. Restoration of terrestrial vegetation would have moderate, long-term benefits by improving the health and diversity of native vegetation, improving wildlife habitat and populations, and enhancing the natural setting and recreational value for hunting, wildlife-viewing, and scenic appreciation.

The ACEC would be ‘Closed’ to new ROW development and mineral and energy activities (except leasable minerals would have a NSO stipulation). Therefore, these activities would not affect the ACEC.

### **4.13.5.5 Mount Dome ACEC**

The Preferred Alternative would result in minor adverse and moderate beneficial impacts. 1,510 acres would be designated as the Mount Dome ACEC to protect the area for raptor habitat. Vegetation treatments and restoration would be conducted for ACEC resources and values and would have minor to moderate long-term benefits, principally for bald eagles.

The ACEC would be ‘Closed’ to new right-of-way development and mineral and energy activities (except leasable minerals would have a “no surface occupancy” stipulation). Therefore, these activities would not affect the ACEC.

### **4.13.5.6 Old Growth Juniper ACEC**

The Preferred Alternative would result in negligible adverse and major beneficial impacts. The Old Growth Juniper ACEC (3,115 acres) would be designated to enhance and protect old growth juniper and associated vegetation and habitats.

Livestock grazing would be available every year, except in the Sheep Valley enclosure. Greater emphasis would be placed on land health standards and protecting sensitive resources from adverse grazing effects, to lessen impacts.

The ACEC would be ‘Closed’ to new ROW development and mineral and energy activities (except leasable minerals would have a NSO stipulation). Therefore, these activities would not affect the ACEC.

### **4.13.5.7 Mountain Peaks ACEC**

The Preferred Alternative would result in minor adverse and major beneficial impacts. The Mountain Peaks ACEC (3,500 acres) would be designated to enhance and protect unique vegetation, wildlife habitat continuity, and visual resources of high-elevation mountain habitats. A portion (985 acres) of the Tule Mountain WSA overlaps the (proposed) ACEC. A ‘Primitive’ ROS designation already applies. OHVs are ‘Limited to Existing Routes’. Development of new ROWs and mineral and energy development are ‘Closed’, because of the wilderness study status of surrounding lands in the Tule Mountain portion of the ACEC, and ‘Closed’ for ACECs on the remaining lands. Leasable minerals would be restricted to NSO requirements (except within the Tule Mountain WSA where it is ‘Closed’), and impacts would be negligible.

Livestock grazing would be available every year. Greater emphasis would be placed on land health standards and protecting sensitive resources from adverse grazing effects, to lessen impacts.

### **4.13.5.8 Timbered Crater ACEC**

The Preferred Alternative would result in negligible adverse and moderate beneficial impacts to the Timbered Crater ACEC area. 17,896 acres would be designated as the Timbered Crater ACEC. Scenic qualities would be preserved under VRM Class I objectives.

Wildland fire management would employ AMR. Juniper treatments and prescribed fire would primarily enhance ACEC resources and values, i.e., Baker cypress, soils, scenic quality, and wildlife. Results would be negligible short-term adverse effects and minor to moderate long-term benefits.

Effects from livestock grazing would be negligible to minor. This is because special status plants are largely protected by a livestock exclusion fence and grazing outside the fenced area is limited to the periphery of the proposed ACEC due to vast lava fields and lack of water.

Treatment areas of invasive juniper would be identified in this ACEC and treatments would be site-specific, resulting in minor long-term benefits for ACEC resources and values.

Constraints on the wildland fire and fuel management programs would apply because the ACEC would exist within the Timbered Crater WSA. Juniper treatments and fire would primarily enhance ACEC resources and values, i.e., scenic quality, non motorized recreation, and wildlife. No mechanized equipment can be used in the WSA. Generally speaking, management actions for the various resource programs would have negligible short-term adverse effects. Long-term benefits would be minor to moderate—depending on the resource and location of management efforts. Restoration of terrestrial vegetation would have moderate, long-term benefits by improving the health and diversity of native vegetation, improving wildlife habitat and populations, and enhancing the natural setting and recreational value for hunting, wildlife-viewing, and scenic appreciation.

OHVs would be ‘Limited to Designated Routes’, which would have negligible adverse effects.



Development of new ROWs and mineral and energy activities are ‘Closed’ because of the wilderness study status of surrounding lands. Therefore, these programs would not affect the ACEC.

With respect to the ROS, the Preferred Alternative allocates about 90% of the ACEC (the least roaded portions of the WSA) to a ‘Primitive’ ROS designation. This would have major beneficial effects for ACEC values, natural resource conservation, and non-mechanized recreational activities. The remaining 10% contain designated roads and trails that would preserve motorized public access to the ACEC.

### 4.13.6 Summary of Effects of the Preferred Alternative

Designation of six new ACECs (a total of 29,171 acres) to protect natural settings, enhance recreation, and preserve unique resources and other ACEC values would be eligible to minor adverse impacts and minor to moderate benefits. Emigrant Trails, Mount Dome, and Mountain Peaks ACECs, where OHVs would be ‘Limited to Existing Roads and Trails’, would have negligible benefits compared to ACECs where OHVs are ‘Limited to Designated Routes’ in the Timbered Crater, Likely Tablelands/Yankee Jim/Fitzhugh Creek, and the Ticker Spring Unit of the Old Growth Juniper ACEC. These last ACECs would have negligible beneficial effects compared to the Sheep Valley Unit of the Old Growth Juniper ACEC, which would be ‘Closed’ to OHVs.

ACECs would be ‘Closed’ to ROW development and mineral and energy activities in order to preserve a natural recreational setting in these unique areas, and protect natural resources and other ACEC values. Livestock grazing will continue in all ACECs, but with various restrictions and measures to protect sensitive resources and ACEC values.

ACEC values, resources, and recreation for the proposed Pit River ACEC would receive somewhat better protection by interim measures protecting WSR segments. Closing all ACECs (29,171 acres) to ROW development and mineral and energy activities would add significant protection for sensitive resources and preserve ACEC values. Designation of the ACECs proposed would improve recreational experiences, preserve natural resources, enhance natural settings, and protect key areas by focusing management attention on the specific needs of these special areas. In this way, user conflicts, public safety issues, and activities that detract from quality recreational experiences can be eliminated or minimized.

### 4.13.7 Cumulative Effects

Recreational activities have been pursued on BLM-administered lands (and adjacent USDA Forest Service lands) since their inception. Growth and development of local communities, as well as larger nearby population centers, such as Reno, Nevada and Redding, California, will increase demand for recreational activities on BLM lands—potentially leading to overcrowding and user conflicts. Recreational experiences, in ACECs and elsewhere, can be preserved or enhanced if addressed during land use planning. When viewed in terms of foreseeable activities and actions on surrounding lands, cumulative effects on ACEC resources and recreation under the Preferred Alternative are not expected to be significant.

As land use intensifies and recreational demands increase, the value of maintaining natural settings and preserving natural resources will be correspondingly greater. Most adverse impacts related to activities connected with BLM resource programs would be temporary and limited to the localities where the activities occur. Designation of ACECs, and the protection they afford, will have moderate value in accommodating increasing recreational demand while simultaneously preserving natural settings and ACEC values vital to maintaining quality recreational experiences and protecting sensitive resources.

OHV limitations, and closure to ROW and mineral and energy development under the Preferred Alternative would have moderate value in protecting natural settings and values that the ACECs are designed to preserve.

### **4.13.8 Mitigation Measures**

There would be no major adverse effects on ACEC resources under the Preferred Alternative; therefore, exceptional mitigation measures would not be required. Where livestock grazing would approach major adverse effects; exclosures, reduction in numbers, changes in the grazing system or season of use would be considered.

### **4.13.9 Unavoidable Adverse Impacts**

Unavoidable adverse impacts are not anticipated from proposed management actions.

### **4.13.10 Short-Term Uses Versus Long-Term Productivity**

Short-term uses include fencing to temporarily exclude livestock or protect archaeological resources and some road closures for fire or fuel management treatments or forestry practices. These would have negligible adverse effects on recreational access and ACEC resources and activities. Treatments such as these will have significant, long-term benefits for soils, water, vegetation (including special status plants), wildlife, and culture resources and will enhance recreational activities such as hunting, fishing, wildlife-viewing, and rural tourism generally. Management actions that enhance ACEC resources and values will generate public confidence in BLM management of public lands.

### **4.13.11 Irreversible and Irretrievable Actions**

There are no irreversible or irretrievable actions.

## 4.14 Potential Effects on Special Designations – National Historic Trails

The AFO has three designated National Historic Trails within its administrative jurisdiction. They are the Applegate Trail (4 miles), Lassen Trail (20 miles), Applegate/Lassen Trail (2 miles-areas where the two trails follow the same course), and the Burnett Cutoff (1 mile). The Yreka Trail (2 miles) is also within the administrative boundary of the field office but has not yet been designated a National Historic Trail. This section describes the direct, indirect, and cumulative effects on these trails, as a result of implementing proposed management actions under the Preferred Alternative.

### 4.14.1 Methodology and Assumptions

The physical and visual features of a trail are the resources that characterize it. An historic trail is evaluated to determine whether it can or should be designated as a National Historic Trail, based on criteria The California Trails Association has developed, along with a classification system which recommends levels of preservation and use for trails on public lands. Criteria can include presence, importance, location, and condition. Sufficient physical and visual characteristics were present to justify designating the Applegate, Lassen, and Burnett Cutoff Trails as National Historic Trails. Approximately 25% of the National Historic Trails within the administrative boundary of the AFO have been inventoried and a classification number assigned. Following are brief descriptions of each of these five classifications:

#### **Class 1: Unaltered Trail**

**Description:** The trail retains the essence of its original character and shows no evidence of having been either impacted by motor vehicles or altered by modern road improvements. There is visible evidence of the original trail in the form of depressions, ruts, swales, tracks, of other scars, including vegetative differences and hand-placed rock alignments along the trailside.

**Preservation:** The trail should be preserved and kept free from all human-made development and intrusions, with a protective corridor adequate to maintain the integrity of location, design, setting, materials, workmanship, feeling, and association.

**Use:** Restricted to hiking and possibly horseback riding, as long as the physical integrity of the trail is not altered.

#### **Class 2: Used Trail**

**Description:** The trail retains elements of its original character but shows use by motor vehicles, typically as a two-track road overlaying the original wagon trail. There is little or no evidence of having been altered permanently by modern road improvements, such as widening, blading, grading, crowning, or graveling. In forested areas the trail may have been used for logging but still retains elements of its original character.

**Preservation:** Should be preserved from any further human-made alterations and intrusions, including road improvements and use as a pipeline/utility corridor. The trail should have a protective corridor adequate to maintain the integrity of location, setting, feeling, and association.

**Use:** Restricted to hiking, horseback riding, and motor vehicles as long as the physical integrity of the trail is not permanently altered. Where the used trail has been abandoned and is badly eroded and/or overgrown with vegetation, it may be desirable to restrict use to hiking and horseback riding.

**Class 3: Verified Trail**

**Description:** The trail route is accurately located and verified from written, cartographic, artifact, topographical, and/or wagon wheel impact evidence. Due to subsequent weathering, erosion, vegetative succession, or logging, trail traces will be nonexistent or insignificant. What does remain is verified trail corridor with no intrusive modern development. Typically this includes trails that once passed through forests and meadows, across excessively hard surfaces or bedrock, over alkali flats and sandy soils, and through ravines or washes.

**Preservation:** Should be preserved from any further human-made alterations and intrusions, with a protective corridor adequate to maintain the integrity of location, design, setting, materials, feeling, and association.

**Use:** Restricted to hiking and horseback riding, consistent with preserving the setting of the trail corridor.

**Class 4: Altered Trail**

**Description:** The trail location is verified but elements of its original condition have been permanently altered, primarily by road construction, such as widening, blading, grading, crowning, graveling, or paving. In some cases, the original trail has been permanently altered by underground cables and pipelines.

**Preservation:** Although an altered trail no longer contributes to the integrity of design, setting, materials, workmanship, feeling, or association, a protective corridor may be desirable in some areas as a way to retain the trail integrity of adjacent or connected Class 1, 2, or 3 segments.

**Use:** Generally unrestricted. However, in protected corridors, use should be consistent with maintaining the integrity of adjacent or connected Class 1, 2, or 3 segments.

**Class 5: Approximate Trail**

**Description:** The trail is either so obliterated or unverifiable that its location is known only approximately. In many cases, the trail has been destroyed entirely by development, such as highways, structures, agriculture, or utility corridors. In others, it has been inundated beneath reservoirs. In some, there is not enough historical or topographic evidence by which to locate the trail accurately. Thus only the approximate route is known.

**Preservation:** None recommended.

**Use:** Unrestricted.

**4.14.2 Incomplete or Unavailable Information**

Although the general locations of the original trails have been mapped, the exact locations of certain segments have not been specifically inventoried or mapped. Detailed analysis of the effects, therefore, is difficult. Further inventory and study is needed for all historical trails on public lands within the boundaries of the AFO.

### 4.14.3 Analysis

The levels of effects used in this analysis are defined as follows:

**Negligible:** The physical or visual characteristics of the area that supported, or would support, National Historic Trail designation would change, but the change would be too small to be of any measurable or perceptible consequence.

**Minor:** The area's physical or visual characteristics that supported, or would support, National Historic Trail designation would change, but the change would be small and, if measurable, would be highly localized.

**Moderate:** The physical or visual characteristics of the area that supported, or would support, National Historic Trail designation would change. The change would be measurable but would remain localized.

**Major:** The physical or visual characteristics of the area that supported, or would support, National Historic Trail designation would change, and the change would be perceptible, measurable, and widespread.

The present condition of the historic trails, as described above, is the baseline for analyzing effects to them and the landscapes integral to them. Considering this baseline, the following assumptions were made:

- The analysis considered effects **adverse** if they would harm or eliminate the physical or visual characteristics that led to or would support designation as a national historic trail.
- The analysis considered **beneficial** if they added to or improved the physical or visual characteristics that led to or would support designation as a national historic trail.

### 4.14.4 Impacts

Proposed management actions include the following:

- Vegetation manipulations, including seeding, chemical, mechanical and biological treatments and prescribed burning;
- Construction and maintenance of water developments, fences, and erosion control structures;
- Maintenance and modification of travel routes;
- Issuance of special use permits; and
- Issuance of utility corridor ROWs, leases, or other land use rights or authorizations.

The specific geographical locations and scope of these actions would be determined in the future. Implementation-level planning and interdisciplinary NEPA analysis would be conducted to determine potential effects to historic trails and the significance of these effects.

Wildland fires on or within the viewshed of historic trails would affect not only the physical features of the trail but also the visual resources surrounding the trail. These visual effects could be either adverse or beneficial to the trail. In many cases the vegetation cover adjacent to the trails, or within the viewshed of the trail, has changed significantly since the trails were established. Juniper and various low growing shrubs have invaded many areas. Reducing this ground cover so it more closely resembles the landscape that existed when the trails were established could be a minor beneficial impact at some locations. Known cultural and historic resources are protected from the disturbance of suppression.

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Therefore, although the adverse effects from a wildland fire itself might be moderate to major, the adverse effects to cultural resources from suppression would be adverse but negligible.

Mechanical harvest of juniper could adversely affect the visual resources and physical traces of historic trails, by altering the setting and context of these primitive trails. Visual resources associated with historic trails could have minor to moderate adverse effects from mechanical harvesting techniques due to slash, cut stumps, and alteration of the trail from heavy equipment.

BLM's AFO would manage WSAs to meet VRM Class I objectives, as required by BLM policy. Such management would have minor benefits to the visual resources of portions of the Lassen Trail that go through the Pit River Canyon WSA, as these segments are already managed for VRM Class I.

The remaining portion of the Lassen Trail and all of the Applegate, Applegate/Lassen, Burnett Cutoff, and Yreka Trails would be managed to meet VRM Class II objectives. The objective of this class is to retain the existing character of the landscape. The level of change to the landscape should be low and result in negligible to minor adverse effects. This would result in negligible adverse effects from present VRM Class I management and have beneficial effects to all four trails.

If Congress releases the Pit River Canyon WSA from interim management status, that portion of the Lassen Trail that goes through the Pit River Canyon WSA would be managed to meet VRM Class II objectives.

No lands containing portions of any historic trails would be selected for disposal. This action would not affect historic trails. Additionally, private lands that contain portions of National Historic Trails could be acquired from willing sellers, and would result in minor to major beneficial effects to historic trails.

ROW applications that are received for power lines and communication sites at the AFO would be reviewed and at times issued near National Historic Trails. All projects must meet VRM Class II standards. In these cases minor adverse impacts could occur to a section of the trail.

The combination of proposed actions to protect historic trails and the minor effects of the proposed actions to manage vegetation, fuels, rangelands, and travel along the historic trails would result in negligible adverse effects and moderate benefits.

### **4.14.5 Analysis of the Preferred Alternative**

Under the Preferred Alternative the following types of fuel treatments are proposed annually for vegetation and habitat restoration:

- Prescribed burning—75 to 10,000 acres,
- Mechanical treatments—75 to 10,000 acres,
- Biological treatments—0 to 1,250 acres,
- Chemical treatments—50 to 2,000 acres.

The specific locations and methods of fuel treatments would depend on many factors that cannot be determined at the RMP level. These proposed treatments could affect the visual resources of the following historic trails:

- Applegate National Historic Trail
- Applegate/Lassen National Historic Trail

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- Burnett Cutoff National Historic Trail
- Lassen National Historic Trail (The portion not within the Pit River Canyon WSA)
- Yreka Trail

Managing these trail segments to meet VRM Class II objectives would reduce the adverse effects to the physical features of these trails or trail segments. Short-term adverse effects, such as dead, dying, or charred vegetation and a black moonscape appearance, could, over the short term, impair the visual resources surrounding these trails. As the landscape recovers, visual resources would see a minor benefit as vegetation moves toward a more natural ecological condition that existed at the time the trails were established. Under this alternative, 10,000 acres proposed for treatment per year, and result in moderate beneficial effects.

The Preferred Alternative would construct 60 miles of temporary and permanent roads and mechanically treat invasive western juniper on 10,000 acres per year. Maintaining VRM Class II management objectives in the areas proposed for treatment adjacent to the historic trails would reduce or eliminate damage to these historic trails or trail segments. Minor adverse short-term impacts could be observed in the visual resources; however, as the landscape recovers visual resources would experience a minor to moderate beneficial effect as the vegetation moves toward a more natural ecological condition. Under this alternative, 10,000 acres are proposed for treatment per year, and would have moderate beneficial effects.

Under this alternative, 445,997 acres would be 'Open' to leasable mineral extraction, such as oil, gas, and geothermal energy, under standard terms and conditions. The potential for the occurrence of oil and gas is low adjacent to the historic trails and it is not anticipated that these areas would be developed during the life of the plan. Operations within the view sheds of historic trails would be required to meet VRM Class II objectives. This would protect the visual resources in the area and negligible to minor adverse effects would occur.

Under this alternative, 470,052 acres would be 'Open' to the removal of locatable minerals. If a locatable mineral claim is developed adjacent to a historic trail, the associated ground disturbance and infrastructure would impact the trail. This impact would be localized, but adverse and moderate. The portions of historic trails within areas 'Open' to the removal of locatable minerals without restrictions would probably have the most adverse effects. The Preferred recommends withdrawal from mineral entry on 32,993 acres which has moderate beneficial effects.

Under this alternative, 435,385 acres would be 'Open' to the removal of such saleable minerals as cinders, sand, and gravel. The activities involved with the removal of saleable minerals would include ground disturbance and development of locations where the saleable minerals are found (i.e., cinder pits and sand and gravel pits). Saleable mineral pits within the viewshed of an historic trail would be required to meet VRM Class II objectives. This would protect the visual resources in the area and a negligible to minor adverse effect would occur.

A total of 80 acres of land managed by the AFO would be designated as 'Open' to OHV use. Under the Preferred all of the Applegate, Yreka, Applegate/Lassen, Burnett Cutoff, and Lassen trails would receive protection from indiscriminate OHV riding that obscures historic linear features such as wagon ruts. OHVs are required to stay on existing or designated routes. Specific impacts cannot be identified, but they would be beneficial and vary from minor to moderate.

#### **4.14.6 Summary of Effects of the Preferred Alternative**

Proposed actions under the Preferred Alternative would result in minor adverse impacts and minor beneficial impacts to the National Historic Trail system. Restricting OHV use to existing and designated routes would result in minor to moderate beneficial impacts to the trails. Managing Trail segments to meet VRM Class II objectives would reduce adverse effects to physical features that have a bearing on context and setting. Moderate beneficial effects would be obtained by the use prescribed fire and mechanical methods to restore the ecological condition that was in place during time of the original trail use.

Leasable and saleable mineral development would have negligible to minor adverse effects, whereas locatable minerals would have moderate adverse effects on trails.

#### **4.14.7 Cumulative Effects**

The area of analysis for cumulative effects for the Applegate, Applegate/Lassen, Burnett Cutoff, Yreka, and Lassen trails includes the portions of the trail on public land administered by the BLM AFO.

Cumulative effects to the trails would result not only from incremental direct effects to the physical features of the trails but also through incremental changes in the landscape surrounding the trails. Many of the vegetation manipulations would have short-term effects on the visual resources surrounding the trails. The long-term effects would be visual resources that more closely represent what was seen when the trails were in use over 150 years ago.

Cumulative effects include vegetation treatments over a 20-year life of this plan. The Preferred Alternative would restrain human actions that consume or use the land and propose actions to restore natural ecological function.

#### **4.14.8 Mitigation Measures**

Mitigation measures are needed for most projects to protect visual resources associated with the historic trail, but particularly on juniper reduction projects which involve mechanical harvesting techniques to insure compliance with VRM Class II designations to maintain setting and context. Site-specific mineral development actions may also require mitigation measures to ensure protection of historic trails is paramount.

#### **4.14.9 Unavoidable Adverse Impacts**

Indiscriminate looting of the physical features of the trails and illegal OHV use would destroy the physical features of the trails, such as original wagon ruts and to a limited degree are unavoidable.

#### **4.14.10 Short-Term Uses Versus Long-Term Productivity**

None.

#### **4.14.11 Irreversible and Irretrievable Actions**

Historic physical features of the trails including cans, bottles, metal artifacts, structures, and wagon ruts are finite resources. The activities on the land throughout history, including looting, livestock grazing, and motor vehicle use, have resulted in the ultimate loss of many physical features of these historic trails.



## 4.15 Potential Effects on Special Designations – Wild and Scenic Rivers

This section describes potential effects resulting from management actions under the Preferred Alternative as they effect (preliminary) WSR classification (i.e., ‘recreational,’ ‘scenic,’ or ‘wild’) and the outstanding and unique values that qualified these river segments for eligibility under the provisions of the Wild and Scenic Rivers Act.

### 4.15.1 Methodology and Assumptions

Analysis of these river segments and determination of eligibility for wild and scenic status was conducted by BLM staff using criteria specified in the Wild and Scenic Rivers Act. (See Appendix J.) The first segment is a three-mile portion of Lower Horse Creek that falls within the Pit River Canyon WSA. The second is a 13-mile portion of the Pit River that flows through the Upper Pit River Canyon. It is also within the WSA. Even though both segments were examined together and both are within the WSA, analysis was based on an independent evaluation of the physical characteristics of each segment. Both have wilderness characteristics and share other, similar, attributes. The eligible portion of Lower Horse Creek joins the Pit River about half-way through the eligible section of the Upper Pit River Canyon WSR. However, each river segment stands alone, regardless of the fate of the other or the Pit River Canyon WSA. Wilderness study issues were addressed where relevant. There are few significant impacts, since WSA status has applied for the past 25 years. The third and final river segment is a portion of the Pit River that flows for 2.5 miles through the Lower Pit River Canyon, a deeply incised, pristine canyon south of Fall River Mills, California.

Once a river, or river segment, is found to be eligible for designation under the Wild and Scenic Rivers Act, it is further evaluated against three criteria (see Appendix J) to determine the most suitable classification (‘wild,’ ‘scenic’ or ‘recreational’) for each eligible segment. ‘Wild’ may be defined as: “Those rivers or sections of rivers that are free from impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. These represent vestiges of primitive America.” ‘Scenic’ is defined as: “Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads.” ‘Recreational’ is defined as: “Those rivers or sections of rivers that are readily accessible by road or railroad, that may have some development along their shorelines, and that may have undergone some impoundment or diversion in the past.” (Wild and Scenic Rivers Act, Section 2a (1), (2), and (3). Various management and use restrictions would then apply according to the river segments previously identified outstandingly remarkable values and its wild, scenic, or recreational classification. The outstandingly remarkable values for the proposed Lower Horse Creek Canyon WSR are botanic/ecologic, historic, and wildlife. Values for the proposed Upper and Lower Pit River Canyon WSRs are geologic, scenic, wildlife, historic, and recreation. The Lower Horse Creek Canyon and Upper Pit River Canyon segments possess wilderness characteristics and provide solitude. BLM planning regulations require BLM to evaluate the impacts of designating—and not designating—eligible segments under the Wild and Scenic Rivers Act. BLM planning regulations also permit sufficient flexibility to analyze other alternatives; this may include both suitable and non-suitable designation possibilities.

All eligible river segments under consideration for WSR designation will be managed under interim protective measures required by the Wild and Scenic Rivers Act until the final version of this RMP is adopted. At that time, any river segment(s) not recommended for designation under this RMP will lose their interim protection. However, river segment(s) that are recommended for designation will remain under interim protection. BLM must then prepare a suitability report to be forwarded, via the Secretary of the Interior, to Congress and the President.

This procedure and the interim protective measures will ensure that the values for which these river segments were recommended are not compromised until such time as Congress makes a decision regarding WSR designation. However, if Congress acts and designates one or more river segments the provisions of the Wild and Scenic Rivers Act apply and site-specific management plan(s) will be formulated. Development of management plans will involve public meetings open to all parties interested in river-related activities and resources.

If WSR protection is not provided, provisions still remain to protect these river corridors under a combination of existing plans and policies. These protect streamside and riparian habitats, riparian and aquatic wildlife, water quality, and cultural and visual resources. There are other provisions to protect public access and river-based recreation. Management of these river segments would not change significantly if they receive wild and scenic river designations. The crucial difference between designation and non-designation would be the level of protection afforded these areas.

Without designation, these river segments would remain available for water diversions and impoundments (dams) and subject to future demands from economically, socially, and politically motivated attempts to use them for purposes that could modify or destroy their wild and scenic character. BLM land-use planning policy permits the amendment of adopted land-use plans—if there is sufficient demand and public support. Under such conditions, BLM could amend plans presently protecting these river segments, as well as riparian areas and adjoining lands, in order to allow water diversions or dam construction—if BLM management at that time determines (through environmental impact assessments and decision records) that such proposals are warranted and proponents can secure the necessary permits and financing. On the other hand, if these river segments receive wild and scenic designation by an act of Congress, they would remain free-flowing; permanently protected from dams, diversions, and other river alterations.

### 4.15.2 Incomplete or Unavailable Information

Adequate information was available to analyze the effects of WSR designation on all proposed river segments at the RMP level.

### 4.15.3 Analysis

This analysis defines the levels of effects on rivers and river segments designated under the Wild and Scenic Rivers Act as follows:

**Negligible:** Changes in characteristics that supported WSR designation are slight and, if measurable, would not have perceptible consequences.

**Minor:** Changes in characteristics that support WSR designation are measurable but small. If perceptible, they are highly localized.

**Moderate:** Changes in characteristics that support WSR designation are readily measurable and perceptible, but fairly localized.

**Major:** Changes in characteristics that support WSR designation are obvious and widespread.

#### **4.15.4 Analysis of the Preferred Alternative**

##### **4.15.4.1 Upper Pit River Canyon and Lower Horse Creek Canyon**

The (proposed) Upper Pit River Canyon and Lower Horse Creek Canyon WSRs are entirely within the Pit River Canyon WSA. Both river segments would be recommended for WSR designation. Both Lower Horse Creek Canyon and Upper Pit River Canyon would be recommended for a 'wild' classification. Benefits would also include the preservation of wildness, solitude, and non-motorized recreational opportunities. Activities such as hiking, sight-seeing, fishing, and hunting would especially benefit from the preservation and improvement of natural settings.

The outstanding and unique values of these river segments would be preserved if both river segments are designated. This would have minor to moderate, long-term beneficial effects since designation by Congress would result in permanent protection. OHV limitations ('Limited to Existing Routes' and restricted by topography) would be permanent. Permanent closure to ROWs and mineral and energy development would also apply.

At this time they are managed under BLM's (wilderness) IMP. The IMP preserves wilderness values, pending congressional action (subject to valid pre-existing rights.) For this reason, impacts to these two river segments will be negligible.

Proposals for uses and facilities within WSAs must be reviewed to determine whether the proposal meets the non-impairment criteria. The non-impairment criteria are: (1) the use, activity, or facility must be temporary (this means that any use, activity, or facility must not create a surface disturbance and must be quickly and easily terminated or removed upon wilderness designation); and (2) when the use, activity, or facility is terminated, the wilderness values must not have been degraded so far as to place a significant constraint on the areas suitability as a wilderness area. The only exceptions to the non-impairment criteria are:

- Emergency activities associated with wildfire or search and rescue operations.
- Reclamation activities designed to minimize impacts created by violations and emergencies.
- Uses and facilities which are "grandfathered" (i.e., have valid pre-existing rights under the terms of the wilderness IMP.)
- Uses and facilities that clearly protect or enhance wilderness values or represent minimal interventions for public health and safety.
- Reclamation of pre-FLPMA impacts.

BLM will ensure that any exceptions that are permitted by the wilderness IMP under the above criteria will not threaten the outstandingly remarkable values, tentative classification, or free-flowing nature of these two river segments. Therefore, adverse short-term effects would be negligible. Long-term effects will hinge on wilderness and/or WSR designation by Congress. Scenic resources in the Upper Pit River Canyon and Lower Horse Creek Canyon are protected under VRM Class I. If these areas are released from wilderness consideration they would be revert to Class II (as identified in the VRM inventory for the area.) This classification will provide major, long-term benefits for scenic quality; or moderate long-term benefits if reduced to Class II.

Both river segments would be managed within ROS class 'Primitive', providing non-motorized recreation and wilderness solitude in a natural setting. Self-reliant activities (such as hiking, site-seeing, hunting, and fishing) typical for 'Primitive' areas will have negligible long-term beneficial effects.

Mineral activities (locatable, saleable, and leasable [including renewable energy development]) are 'Closed' in both WSR segments, and have been since the Pit River Canyon WSA was established the late 1970s. There has been some interest in saleable materials (decorative rock and cinders), but mineral potential and development interest is low for both river segments, as well as being in WSA status. The Malacha Hydro project diverts water upstream of the WSA, skirts it through a tunnel outside of the corridor, and then generates power below the study area. For these reasons, there would be no impacts from mineral and energy activities for either proposed WSR.

OHVs are 'Limited to Existing Routes' in both river segments, and have been since the Pit River Canyon WSA was established the late 1970s. In any case, both WSR corridors are without roads and, therefore, inaccessible to vehicles (although a few routes end near canyon rims in close proximity to proposed river segments.) Therefore, there will be no impacts from OHV use.

Cultural resources are protected under Section 106 of the NHPA. This is relevant where branches of the National Historic Lassen Emigrant Trail run in close proximity to both river segments and on both sides of the gorge in the (proposed) Upper Pit River Canyon WSR. Management of these trails and features will have negligible beneficial effects on WSR values.

If the Pit River Canyon WSA is released from wilderness consideration by Congress, both river segments will be managed according to direction in this RMP. Guidelines, management, and impacts would be similar to that described for the (proposed) Lower Pit River WSR. In other words, BLM would protect the outstandingly remarkable values, tentative classification, and free-flowing nature of these river segments for possible future inclusion in the wild and scenic river system. This policy would have major, long-term benefits for the protection of these river segments, if wilderness designation is denied for the Pit River Canyon WSA.

Most livestock grazing would continue if either or both proposed WSRs are designated. However, generally speaking, both river corridors are inaccessible to livestock. Some grazing does take place on canyon rims, the extreme upper and lower ends of the Upper Pit River Canyon, and the upper end of Lower Horse Creek Canyon. Where this use does occur, compliance with land health standards, desired future conditions, and riparian habitat objectives is mandatory. Therefore, livestock grazing will have negligible to minor adverse long-term effects.

Generally only scattered pines are found within the canyons of both river corridors. There are a few small stands of timber in Horse Creek, but the topography is rugged and the quantity is small. Therefore, timber would not be harvested and there would be no impacts from this activity in either (proposed) WSR.

Water quality would be protected through compliance with BLM and state water quality standards, so short and long-term adverse effects would be negligible.

BLM would seek to acquire parcels adjacent to both river segments on a willing-seller basis. Such acquisitions would consolidate lands into a larger, more effective, and more easily managed whole that would add significant recreational value to the Upper Pit River Canyon segment, in particular. Such acquisitions are likely to improve access for fishing, hiking, and sight-seeing and would improve the wild and solitary character of these areas. Depending on opportunities and funding, this could have minor to major beneficial effects for these WSRs.

The outstandingly remarkable values of these river segments would be preserved by recommending WSR designation and a 'wild' classification for both segments. Modifications to streams and banks would not be permitted. However, protection is limited to shorelines or other lands within these river corridors that are managed by BLM and not subject to valid pre-existing rights.

Overall, this would have major, long-term beneficial effects since designation by Congress with a ‘wild’ classification for both segments would provide the highest degree of permanent protection. OHV limitations (‘Limited to Existing Routes’ and restricted by topography) would be permanent. Permanent closure to ROWs and mineral and energy development would also apply.

The Preferred Alternative would, therefore, have major long-term benefits from protection of WSR values and tentative classification, and the assurance that river segments would remain free-flowing. Benefits would also include the preservation of wildness, solitude, and non-motorized recreational opportunities. Activities such as hiking, sight-seeing, fishing, and hunting would especially benefit from the preservation and improvement of natural settings. A ‘wild’ designation for both areas should result in economic benefits from rural tourism. It will have unknown effects on the local economy.

The outstanding and unique values of these river segments would be preserved by recommending WSR designation and a ‘wild’ classification for both segments. Modifications to streams and banks would not be permitted along BLM-administered shorelines. However, protection is limited to shorelines or other lands within these river corridors that are managed by BLM and not subject to valid pre-existing rights. Overall, this would have major, long-term beneficial effects since designation by Congress with a ‘wild’ classification for both segments would provide the highest degree of permanent protection. OHV limitations (‘Limited to Existing Routes’ and restricted by topography) would be permanent. Permanent closure to ROW and mineral and energy development would also apply.

### ***Cumulative Effects – Upper Pit River Canyon and Lower Horse Creek Canyon***

Adding these two river segments to the national wild and scenic river system would permanently protect 13 miles of spectacular and rugged, river-and-gorge country, in a state essentially unaltered by the hand of man. This stretch represents about 7% of the river’s 200-plus miles. Elsewhere in the Pit River drainage, there are numerous small irrigation dams, some channelization, and several hydro-power diversion dams—one upstream and five downstream of the WSR segments. Cumulative effects from river and watershed development outside the proposed WSR segments have resulted in a small powerline corridor south and west of the lower end of the Upper Pit River Canyon WSR, and none on the Lower Horse Creek Canyon WSR. Water taken out for the Malacha hydro project has negligible adverse effects on the Upper Pit River Canyon WSR, as a minimum flow is in place prior to diverting water. No cumulative impacts from minerals and energy or ROWs can be seen from either WSR.

Water temperature, quality, and quantity of flow are adversely affected in both WSRs from upstream diversions and irrigation in ranching and farming operations on private lands.

Protection of these river segments, and adjacent BLM-administered lands, benefits traditional back-country recreational uses. However, preserved in a natural, free-flowing state, these river segments have the potential to attract additional visitation and fulfill increased demand for river-related recreational activities—with unknown cumulative economic benefits for the local community. Increased use will also present minor long-term adverse effects from greater noise, litter, and (potential) user conflicts. However, these effects would be easily outweighed by the permanent preservation of wild and scenic values, aquatic and terrestrial ecosystems, and associated benefits for wildlife and back-country recreation.

**4.15.4.2 Lower Pit River Canyon**

A 2.5-mile segment of the Lower Pit River Canyon would be recommended for WSR designation with a ‘scenic’ classification. The river segment would be preserved to protect its free-flowing nature and stream modifications (e.g., water diversions, impoundments, channelization, or “rip-rap”) would not be permitted. However, protection is limited to shorelines or other lands within the river corridor that are administered by BLM and not subject to valid pre-existing rights. This would have major beneficial effects by protecting outstandingly remarkable values, natural settings, and river-related recreational pursuits in the WSR. It would also benefit terrestrial and aquatic wildlife and vegetation.

This portion of the Lower Pit River Canyon would be ‘Closed’ to mineral and energy development, utility corridors, and ROWs. In any case, there is little potential for or interest in mineral or renewable energy development in this area. These closures would have major beneficial effects for WSR values and recreational activities where enjoyment largely depends on an unaltered natural environment (e.g., site-seeing, hiking, fishing, hunting, and kayaking.) This would have major long-term benefits for WSR values.

The outstandingly remarkable values and free-flowing nature of this river segment would be preserved under a ‘scenic’ classification until WSR determination is made by Congress. Modifications to streams and banks would not be permitted. Permanent closure to ROW and mineral and energy development would also apply. OHV limitations (‘Limited to Existing Routes’ and restricted by topography) would be permanent. Overall, this would have major long-term beneficial effects since designation by Congress with a ‘scenic’ classification would provide a high degree of permanent protection.

Lower Pit River Canyon would be managed as VRM Class II to protect the outstanding and unique geology of its canyon and riverine environment. This classification will provide moderate, long-term benefits for scenic quality.

This river segment would be managed as ROS class ‘Primitive’, providing non-motorized recreation and wilderness solitude in a natural setting. Self-reliant activities (such as hiking, site-seeing, hunting, fishing, and river-rafting) typical for ‘Primitive’ areas will have negligible long-term impacts.

The Preferred Alternative would limit OHVs to existing roads and trails. An historic road runs through the canyon and crosses the Pit River near the western boundary of the WSR. However, the section within the WSR corridor is inaccessible to vehicles due to trees, brush, and rock fall. Several motor-vehicle routes end near canyon rims. Because of these physical limitations, there would be no impacts from OHVs. This situation would have negligible beneficial effects for ecosystems and the natural setting. Recreational activities, in general, are not expected to have adverse effects and further enhancement of the natural setting, vegetation, and wildlife populations, is likely.

Cultural resources are protected under Section 106 of the NHPA. The historic road through the canyon has been used since the 1840s by explorers, railroad surveyors, and the military. In the 1880s it was a toll road. It was last maintained in the 1930s when it formed a segment of old State Highway 299. This road would be managed to protect its historic significance and to function as the basis of a (proposed) system of hiking trails involving community partnerships. Protection and maintenance of this road and construction of hiking trails will have moderate long-term recreational benefits and negligible adverse impacts on WSR values.

Water quality would be protected through compliance with BLM and state water quality standards, so short and long-term adverse effects would be negligible.

BLM would seek to acquire parcels adjacent to both river segments on a willing-seller basis. Such acquisitions would consolidate lands into a larger, more effective, and more easily managed whole that would add significantly to the recreational value of the Lower Pit River Canyon segment. Such acquisitions are likely to improve access for hiking, fishing, hunting, river-rafting, and sight-seeing. Depending on opportunities and funding, this could have minor to major beneficial effects.

### ***Cumulative Effects – Lower Pit River Canyon***

Adding this river segment to the national wild and scenic river system would permanently protect 2.5 miles of spectacular and rugged, river-and-gorge country, in a state essentially unaltered by the hand of man. This stretch represents about 2% of the river's 200-plus miles. Elsewhere in the Pit River drainage, there are numerous small irrigation dams, some channelization, and several hydro-power diversion dams—one upstream and five downstream of the proposed WSR segment. Cumulative effects from agriculture, river, and watershed development outside the proposed WSR segment, as well as hydro projects which have had adverse impacts to water quality and quantity from reduced flows of major tributaries entering the Pit River above the WSR stretch. OHVs are physically limited from entering the WSR and no impacts would occur. Immediately downstream a large hydro project has a powerhouse, high voltage powerlines, and a large return flow of water from Fall River. Mineral potential is low in the area, although the entire area is underlain with diatomaceous earth, which has commercial and household uses. Decorative stone is collected in the general area, but no sources are present in the WSR. State route 299 is approximately 1 mile north of the WSR, but cannot be seen. Several low key roads end near the canyon rim, but are not visible from the WSR.

Protection of this river segment, and adjacent BLM-administered lands, benefits traditional back-country recreational uses. However, preserved in a natural, free-flowing state, this river segment has the potential to attract additional visitation and fulfill increased demand for river-related recreational activities—with cumulative unknown economic benefits to the local community. Increased use will also present minor long-term adverse effects from greater noise, litter, and (potential) user conflicts. However, these effects would be easily outweighed by the permanent preservation of wild and scenic values, aquatic and terrestrial ecosystems, and associated benefits for wildlife and back-country recreation.

### **4.15.5 Mitigation Measures**

Mitigation measures are not applicable.

### **4.15.6 Unavoidable Adverse Impacts**

If WSR designations are not recommended in this PRMP and/or Congress does not designate the Pit River Canyon WSA, all three river segments would be subject to various engineering alterations—such as water diversions, channelization, placement of “rip-rap,” and construction of impoundments (dams) that would nullify their free-flowing character and destroy any future possibility of inclusion in the WSR system.

### **4.15.7 Short-Term Uses Versus Long-Term Productivity**

If WSR designation is not recommended in the plan and/or Congress does not designate the Pit River WSA, water diversions and other stream, river, or terrestrial alterations may take place. Considering the extensive development that has already taken place elsewhere in the watershed and the small size of the proposed WSR segments, further economic returns from such developments are likely to be very modest and would almost certainly destroy any future possibility of inclusion in the WSR system.

On the other hand, local economic benefits from increased river-related recreation (plus the preservation of traditional recreational activities in these river segments) and their recreational, scenic, and experiential value for the visitor population at large would have far greater significance and value in the long term.

**4.15.8 Irreversible and Irretrievable Impacts**

Without legal protection stream impoundments, channelization, ‘rip-rap,’ or other permanent alterations could occur within these river segments and their outstandingly remarkable values and free-flowing nature could be permanently lost. Therefore, any future possibility of WSR designation would be destroyed.



## 4.16 Potential Effects on Special Designations – Wilderness Study Areas

The AFO administers the Timbered Crater (17,896 acres), Pit River Canyon (10,984 acres), Tule Mountain (16,998 acres), and Lava (10,770 acres) WSAs. The field office also administers the Baker Cypress Natural Area Instant Study Area (ISA) that is located entirely within the Timbered Crater WSA. This section describes the direct, indirect, and cumulative effects on the WSAs administered by the AFO as a result of implementing proposed management actions under the Preferred Alternative.

### 4.16.1 Methodology and Assumptions

The wilderness values of roadlessness, naturalness, and solitude characterize the WSAs and support their designation as wilderness. These characteristics were inventoried for each WSA and are described in detail in the California Statewide Wilderness Study Report (BLM 1990). Since this report was published, the WSAs have been managed under the BLM wilderness IMP (BLM 1995). The management guidelines included therein are designed to protect the wilderness values in each WSA and ISA and to ensure that Congress's prerogative to designate these areas as wilderness is not impaired.

In determining potential impacts to the WSAs and ISA, all resource management decisions were compared to the baseline inventories detailed in the California Statewide Wilderness Study Report (BLM 1990) to determine if they would affect the WSAs' characteristics.

### 4.16.2 Incomplete or Unavailable Information

All the information needed was available to analyze the effects of resource management decisions at the RMP level.

### 4.16.3 Analysis

The levels of effects used in this analysis are defined as follows:

**Negligible:** Wilderness characteristics that support wilderness designation would change, but the change would be too small to be measurable or of any perceptible consequence.

**Minor:** Wilderness characteristics that support wilderness designation would change, but the change would be small and, if measurable, would be localized.

**Moderate:** Wilderness characteristics that support wilderness designation would measurably change, but the change would remain localized.

**Major:** Wilderness characteristics that support wilderness designation would substantially change, and the changes would be perceptible, measurable, and widespread.

The following assumptions were made in evaluating the effects of the resource management decisions:

- The analysis considered effects on the WSAs as *adverse* if they would harm or eliminate the wilderness characteristics that would support designation as wilderness.
- The analysis considered effects on the WSAs as *beneficial* if they would add to or improve the wilderness characteristics that would support designation as wilderness.

#### **4.16.4 Impacts Common to All WSAs**

WSAs would be managed under BLM's IMP, which protects their wilderness values pending congressional action, subject to valid existing rights.

All proposals for uses and/or facilities within WSAs would be reviewed to determine whether the proposal meets the non-impairment criteria. The non-impairment criteria are: (1) the use, facility, or activity must be temporary (this means a temporary use that does not create surface disturbance or involve permanent placement of facilities may be allowed if such use can easily and immediately be terminated upon wilderness designation); and (2) when the use, activity, or facility is terminated, the wilderness values must not have been degraded so far as to significantly constrain the area's wilderness suitability for preservation as wilderness. The only permitted exceptions to the non-impairment criteria are:

- 1) Emergencies associated with wildfire or search and rescue operations.
- 2) Reclamation activities designed to minimize impacts created by violations and emergencies;
- 3) Uses and facilities which are considered grand fathered or valid existing rights under the IMP;
- 4) Uses and facilities that clearly protect or enhance the land's wilderness values or are the minimum necessary for public health and safety; and
- 5) Reclamation of pre-FLPMA impacts.

The 'minimum tool' concept would be applied to any approved actions within WSAs. This means that any actions would be accomplished using methods and equipment that have the least impact on the quality of an individual or group's wilderness experience, as well as the physical, biological, and cultural resources with the WSA. Pre-FLPMA developments may continue to be used and maintained in WSAs to keep them in an effective, usable condition, but can not be modified to where they exceed the physical and visual impacts existing at the time FLPMA passed. New, temporary developments would need to satisfy the nonimpairment criteria and truly enhance wilderness values. New, permanent developments must satisfy the nonimpairment criteria, enhance wilderness values, and not require motorized access if the area were designated as wilderness. Pre-FLPMA facilities such as waterholes, spring developments, guzzlers, and fences are considered grand fathered, they may be maintained periodically using motorized equipment, if through analysis, that method was found to be the minimum tool necessary for maintenance.

VRM Class I objectives would apply to all WSAs until Congress designates them as wilderness or releases them from BLM's Interim Management Policy requirements. VRM Class I status protects the WSAs' visual wilderness characteristics. VRM principles applied during the planning phase of proposed projects prevents adverse effects and increases the benefits of projects designed to improve wilderness characteristics.

No WSAs contain leases that were issued prior to October 21, 1976 that would contain grandfathered rights. All WSAs are now 'Closed' to mineral leasing. This would prevent minor to major disturbance to wilderness characteristics such as from new roads, facility construction, and significant ground disturbance. The potential of the areas for the occurrence of oil and gas is low.

No WSAs contain locatable mineral claims established prior to October 21, 1976 that would contain grandfathered rights. All WSAs are 'Open' to exploration for and development of locatable minerals but would be limited to activities that do not require reclamation, and must meet non-impairment criteria. This would prevent minor to major disturbance to wilderness characteristics such as from new roads, facility construction, and significant ground disturbance. In addition, rock types that typically host metal deposits are absent and the potential of the areas for the occurrence of gold, silver, or diatomite is low.

All WSAs are 'Closed' to saleable mineral disposal. This action would prevent minor to major adverse effects to the wilderness characteristics such as new roads, facility construction, and significant ground disturbance.

BLM would follow the Alturas Land Tenure Adjustment Plan. This plan recommends acquiring private lands with unique characteristics of the geographic area from a willing seller. This includes acquisition of private lands adjacent to the Pit River Canyon WSA. If acquired, they would be managed to protect wilderness characteristics. This action would have minor to major beneficial effects with more acres of wilderness characteristics that would be secured and the land would be managed to protect these values. Not only would more acres with wilderness characteristics be acquired, the original WSA would be protected from potential loss of wilderness characteristics when access is granted to the private in holding.

OHVs are 'Limited to Existing Roads and Trails' in the Tule Mt., Pit River, and Lava WSAs. Negligible beneficial effects would occur, as all WSAs have had OHV use 'Limited to Existing Roads and Trails' since 1979 when the WSAs were established. OHVs within the Timbered Crater WSA would be 'Limited to Designated Routes'.

### 4.16.5 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse effects to wilderness characteristics, naturalness, and solitude within four WSAs.

454,649 acres of the AFO would be available for grazing, and 48,396 acres would be unavailable. Livestock management would continue where it currently exists; however, adjustments would be made where needed, such as implementation of grazing systems, to meet land health standards. This would result in a minor beneficial effect to naturalness in all four WSAs.

In Timbered Crater OHVs are 'Limited to Designated Routes', and would have a negligible adverse effect.

All actions would be held to the nonimpairment criteria and minimum tool requirements in the Interim Management Policy, thus avoiding impacts to wilderness characteristics. Proposed management actions would result in minor beneficial to all four WSAs.

WSAs would be managed under BLM's IMP, which protects their wilderness values pending congressional action, subject to valid existing rights.

No WSAs contain leases that were issued prior to October 21, 1976 that would contain grand fathered rights. All WSAs are now 'Closed' to mineral leasing. This would prevent minor to major disturbance to wilderness characteristics such as from new roads, facility construction, and significant ground disturbance. The potential of the areas for the occurrence of oil and gas is low.

No WSAs contain locatable mineral claims established prior to October 21, 1976 that would contain grand fathered rights. All WSAs are 'Open' to exploration for and development of locatable minerals but would be limited to activities that do not require reclamation and must meet non-impairment criteria. This would prevent minor to major disturbance to wilderness characteristics such as from new roads, facility construction, and significant ground disturbance. In addition, rock types that typically host metal deposits are absent and the potential of the areas for the occurrence of gold and silver is low.

Acquisition of private lands adjacent to Pit River Canyon WSA would have minor to major benefits with more acres that contain wilderness characteristics would be secured and the land would be managed to protect these values.

### **4.16.6 Cumulative Impacts**

The area of analysis for cumulative effects to the WSAs includes 56,648 acres of public lands within the WSAs, and potential acquisition of 740 acres of private land from willing sellers adjacent to the WSAs.

The baseline for analysis consists of the inventories detailed in the California Statewide Wilderness Study Report (BLM 1990).

Management under the IMP has avoided any past actions that would have a cumulative effect on the wilderness characteristics of the WSAs. No proposed actions would adversely affect the WSAs.

### **4.16.7 Mitigation Measures**

No proposed actions would result in major adverse effect on the wilderness characteristics that would support the designation of the WSAs as wilderness. Therefore, mitigation measures are not needed at this level.

### **4.16.8 Unavoidable Adverse Impacts**

No unavoidable adverse impacts have been identified.

### **4.16.9 Short-Term Uses Versus Long-Term Productivity**

None were identified.

### **4.16.10 Irreversible and Irretrievable Actions**

No irreversible or irretrievable actions would affect WSAs.

## 4.17 Potential Effects on Travel Management

The AFO regulates motorized and non-motorized travel on public lands and public waters it administers in northeastern California. This section describes direct, indirect, and cumulative effects as a result of implementing proposed management actions under the Preferred Alternative.

### 4.17.1 Methodology and Assumptions

Road system construction standards and maintenance regimen determine the longevity of roads as well as ease and manner of access. Use generally increases with improved road conditions and decreases as conditions deteriorate. To analyze effects, all available information on existing roads and trails was compiled for the AFO management area. A number of assumptions were made, as follows, regarding future travel and access management:

- Travel maps would be prepared depicting designated routes, and would include permanent and seasonal travel restrictions. These would be available to the public. The road system would provide access for visitors, permittees, non-federal landowners (inholdings), and administration without adversely affecting the resources and natural values of public lands administered by the AFO.
- BLM would coordinate road management with adjacent local government agencies so that the transportation system would be maintained in a logical and comprehensive manner. BLM will work cooperatively with local governments and landowners to provide appropriate access to public lands.
- Modes of travel examined in this analysis included four-wheel drives vehicles, all-terrain vehicles (ATVs), motorcycles, snowmobiles, bicycles, livestock, ski-touring/snowshoeing, and foot travel on a route network consisting of federal and state highways, county roads, four-wheel drive roads, and trails for non-motorized use. This also includes boating on rivers, lakes, and reservoirs.
- Standard road classifications were developed for the purpose of identifying and defining roads within the management area. These are described in Chapter 3.18 “Travel Management”.
- All types of recreational use are likely to increase over the 20 years of the planning period. Demand will continue from local residents, visitors, and a variety of interest groups. Requests for special event and commercial recreation permits will increase as more community groups, clubs, commercial, and educational organizations rely on BLM for convenient access to public lands on a daily basis. One of the key issues affecting recreation management decisions is the growth of recreational activities in the management area. A market study prepared in 2002 for the northeastern California area identified non-motorized activities (such as day-hiking) as some of the most popular activities, while vehicle-based activities such as country driving and sight-seeing were also very popular. OHV activities, although not high on the list, were recognized as a growing resource activity. Providing a quality experience for those participating in motorized activities and maintaining opportunities for high-quality non-motorized activities while avoiding user conflicts is an important management objective.
- The baseline for determining potential effects on the travel route network is the road inventory conducted in 2004. Resource management decisions were evaluated to determine if and how they would affect this travel route network. Since the first road inventories (associated with the wilderness study areas) were completed in the late 1970s, route proliferation has occurred throughout the management area.

### 4.17.2 Incomplete or Unavailable Information

Information required to analyze the effects of resource management decisions at the RMP level was generally available. However, about 20% of the AFO management area still requires a route inventory.

### 4.17.3 Analysis

For the purpose of this analysis, effects on travel access were considered *adverse* if they would result in restriction or elimination of public access, and *beneficial* if they would increase or establish public access. The intensity of impacts on access and travel are defined as follows:

**Negligible:** A change would occur to public access, but the change would have no significant or measurable effect on road conditions or public access.

**Minor:** Changes to public access or road condition would be detectable, but with little or no overall effect. If measurable, effects would be much localized.

**Moderate:** Effects would be clearly detectable, and management actions would have an appreciable effect on road conditions or public access. Change would be clearly measurable, but still localized.

**Major:** Effects would be substantial and obvious, and road conditions or public access could be permanent or widespread.

### 4.17.4 Impacts Common to All Travel Activities

Concerning the effects of exclosures for the protection of cultural resources, wildlife habitat, and riparian areas, the following management and effects apply: Roads in riparian areas would be maintained, re-routed, eliminated, and/or rehabilitated. Fences, gates, pipelines, cattle-guards, and vegetation treatments for the improvement of wildlife habitat or livestock forage could eliminate or hinder public access—except by foot—into fenced areas. This would be a minor adverse effect if located in areas with designated ‘Open’ access and negligible effects in areas where access is ‘Limited to Existing or Designated Routes’ since motor vehicle access is already limited to roads and trails in some areas. If a fenced areas has designated or existing routes public access would be maintained.

Management actions affecting wild horses are not expected to adversely affect travel management because they do not include travel restrictions or area closures. Similarly, management actions for wild horses would have no beneficial effects for travel management.

Road closures during wildland fire suppression activities or prescribed burns would result in negligible adverse effects to travel access due to the brief duration of road closures. Temporary, minor adverse impacts on public access and travel would result from the effects of smoke and diminished air quality. When negligible impacts occur to public access and travel from fuel management activities (prescribed fire, mechanical, and hand treatments), no discussion is indicated or offered, unless the proposed management action would result in moderate or major impacts.

Removal of invasive native species (such as western juniper) and noxious exotic weeds (such as yellow star thistle and Scotch thistle) would have a beneficial but minor effect on access and travel routes, as would the maintenance or development of public firewood areas. This would result from improved access as a result of these activities.

Where watershed activities or regulations restrict or limit travel in perennial and intermittent drainages, travel activities would be adversely affected. Travel management in these areas may involve road closures or relocations and travel restrictions to protect riparian and wetland areas. The route network could be disrupted, reducing access in some areas, while other restrictions may limit choices for dispersed activities associated with certain modes out travel.

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Negligible to minor adverse effects would result from such restrictions in areas with 'Open' access designation. There would be no effect on areas that are 'Closed' or "Limited to Existing or Designated Routes."

Lockable vehicle barriers and buffer zones would be provided in compliance with the bald eagle nesting territory habitat management plans (HMPs.) Public access would be restricted from January 1 to August 31. This action would have a negligible adverse effect, since other (open) roads access nearby areas.

OHV access would be limited to existing roads around the vernal pools (supporting special status plants) in the Lava WSA. Negligible adverse effects would result from these restrictions.

The management area would be open to over-snow vehicle travel, with Nelson Corral High Country and Dead Horse Loop areas identified for snow play. These areas total 17,000 acres. Overall, minor beneficial travel effects would result, together with unknown economic benefits. These decisions affirm existing over-snow motorized travel opportunities.

Designation of travel corridors on existing roads and trails according to ROS classifications in 'Roaded natural,' SPM, and SPNM areas; modification to the existing travel route network; construction of new routes; and re-routing would be subject to VRM considerations in the planning process. This would have a negligible to minor effect on the travel network because it may require that a route be located in a less desirable location to comply with VRM requirements.

Build a one-mile interpretive and discovery trail at the Descent into Goose Lake. Seven additional miles of hiking trails are proposed at the Battle of the Infernal Caverns and 2 miles at Williams Ranch, and 1 mile at the Pit River campground. Acquisition of the Modoc rail line would provide 40 miles of rail corridor trail use. An overall minor beneficial effect on travel access would result, with benefits to rural tourism.

Exemptions for off-road travel are limited to authorized and permitted activities such as; wood-cutting, permitted flat rock collection, private property access, scientific studies, BLM administrative activities, ranching, game retrieval, noxious weed eradication, etc. This would have a negligible adverse effect on the travel network as most off-road travel is associated with hunting, and is otherwise restricted to existing roads and trails

Land ownership adjustment transactions—including acquisitions and disposals—would maintain, decrease, or improve public access. Such decisions would have negligible to major beneficial or adverse effects on travel, depending on the transaction.

Acquire 13 miles along the Pit River and 5 miles along Hat Creek from PG&E for the purpose of improving public access and recreation opportunities. These acquisitions would have major beneficial effects on travel and public access.

Provide appropriate public access (e.g., walk in, drive in, accessible surfaces) to waters adjoining BLM lands consistent with ROS classifications established in this RMP for lakes, reservoirs, and stream segments. Acquire necessary easements from willing sellers.

Secure public title or access to abandoned railroad grades in the management area. Minor to major beneficial effects on travel and public access would result. Securing an easement to a short section of railroad grade would be a minor beneficial effect. On the other hand, acquisition of key parcels and complete linear corridors would have a major beneficial effect on public access.

The overall effect of acquiring easements from (willing) landowners to gain access to public lands would be negligible to minor beneficial effects on public access.

New ROW authorizations may have negligible to major beneficial effects on public access. Minor increases in public access would result if new roads are built, or significant increases in public access could result if a new county road or state highway is authorized. Increase in visitor use may have negligible to major impacts on public access due to the possibility of increased travel restrictions if soils, roads, and wildlife habitat are adversely affected during wet weather conditions.

Obliterate unauthorized routes in WSAs as required under the Wilderness IMP. This reaffirms Congressional direction and BLM policy which restricts motorized and mechanized vehicles to existing roads and ways in WSAs. Elimination of motorized public access in these areas is a minor adverse effect. Maintenance of areas for non-motorized travel has a minor beneficial effect.

For the AFO management area, roads and trails documented in the 2004 route inventory would be designated for use by four-wheel drive vehicles, motorcycles, or ATVs. Certain roads may be designated for a single use, based on current use and road design. Negligible adverse effects would result because most travel routes would remain designated for all types of vehicles; design of the road or trail and the terrain usually determines use.

### 4.17.5 Analysis of the Preferred Alternative

The Preferred Alternative includes six ACECs (about 29,171 acres). Travel would be restricted to designated or existing roads and trails throughout the management area. Motorized travel opportunities could be further reduced in the ACECs, but this would be a minor adverse effect. The Preferred Alternative includes for control of invasive juniper. Road-building associated with mechanical harvesting of juniper (up to 50 miles of temporary and 10 miles of permanent) would have negligible to minor beneficial effects on travel and public access. New travel opportunities would be provided in areas that are currently inaccessible; however, most routes would eventually be closed and rehabilitated, providing only short-term travel and access benefits.

#### 4.17.5.1 Motorized Travel

Under the Preferred Alternative, motor vehicles would be 'Limited to Existing or Designated Routes' on more than 99% of the management area (including WSAs, in compliance with the Wilderness IMP). The Cinder Cone OHV Management Area (80 acres) would have an 'Open' (unrestricted) OHV travel designation. Less than 1% (4,625 acres) would be 'Closed' to motor vehicles. OHV travel designations would apply to the entire management area. This would result in major adverse effects to travel. The Preferred Alternative has minor beneficial effects for motorized travel when "Closed" designations are considered.

About 81 miles of motor vehicle roads would be 'Seasonally Closed'. This would result in a minor adverse effect on motorized travel opportunities.

#### 4.17.5.2 Non-Motorized Travel

Approximately 25.5 miles of new and existing trails would be maintained with non-motorized designations. Construction of new trails would have moderate beneficial effects—depending on trail location—because this would create opportunities for new non-motorized, trail-based recreation for those who prefer this to cross-country travel. In addition, development of the Modoc Line (if acquired) would bring moderate to major beneficial effects by providing travel opportunities between significant population centers in Lassen and Modoc Counties.



Non-motorized travel between Susanville and Alturas, California is currently limited to the shoulder of U.S. Highway 395.

### 4.17.5.3 Boating

Motorized boating would not be restricted on West Valley Reservoir. Powerboats on Nelson Corral Reservoir and Delta Lake would be limited to electric trolling motors. Bayley Reservoir would be restricted to small four-cycle outboards, or electric trolling motors (by 2012), and Moon Lake would be unrestricted. Personal watercraft (jet-skis or waverunners) would not be allowed, except on West Valley reservoir.

The Pit River would be limited to non-motorized craft. Commercial white-water rafting on the Lower Pit River would be limited to three annual permits in order to maintain aesthetics and a quality experience for all user groups. These decisions would result in minor adverse effects on motorized boating on waterways where restrictions apply.

### 4.17.5.4 Recreation Opportunity Spectrum

Travel management decisions regarding OHVs generally restrict motorized travel to existing or designated routes. Assignment of ROS classifications would affect motorized travel opportunities according to the following percentages for the Preferred Alternative:

***‘Primitive’***—11% (55,594 acres): Unmodified natural landscape; little use and no on-site management controls. Motorized travel is restricted to existing or designated roads and trails within ‘Primitive’ areas. Adverse effects on motorized travel and public access are negligible. Minor to moderate beneficial effects to Non-motorized recreation experiences would occur with the ‘Primitive’ setting.

***‘Semi-Primitive Non-Motorized’***—13% (63,472 acres): Predominantly natural landscape; low use and few management controls. Minor beneficial effects would occur to a large portion of the remainder of the field office landscape, which is allocated at 67% for SPNM and SPM settings, which provides a mix of opportunities for non- motorized and motorized recreation activities on public lands.

***‘Semi-Primitive Motorized’***—54% (273,539 acres): Largely natural landscape; some evidence of others and few management controls. Minor beneficial effects would occur to a large portion of the remainder of the field office landscape, which is allocated at 67% for SPNM and SPM settings, which provides a mix of opportunities for non- motorized and motorized recreation activities on public lands.

***‘Roaded Natural’***—22% (110,669 acres): Natural appearance retained but modifications present; moderate use and visible management controls; proximity to improved and maintained roads.

### 4.17.6 Summary of Effects of the Preferred Alternative

Effects on motorized travel and public access would be adverse and moderate to major, because of the switch to a ‘designated’ travel route network (which would eliminate cross-country OHV use) and depending on the number and nature of temporary and permanent route closures. On the other hand, there would be minor to moderate beneficial effects on non-motorized travel due to construction of new trails with non-motorized designations.

#### **4.17.7 Cumulative Effects**

When considered in conjunction with land use decisions and programs for surrounding lands, management decisions for BLM-administered lands have the potential to adversely affect public access and motorized travel. Historically, people have freely traveled on BLM and adjacent USDA Forest Service-administered lands while engaged in a wide range of activities. Population growth and development pressures both locally and in nearby urban centers (such as Reno, Nevada and Redding, California) continue to increase demand for activities on public lands. This leads to potential use conflicts when access is limited—as it must be to protect valued resources and the natural environment.

For this reason, Modoc, Klamath, and Lassen National Forests—in addition to BLM—are currently involved in travel management planning that will change motorized travel designations from ‘Open’ to ‘Limited to Existing or Designated Routes.’ The baseline for cumulative effects on the BLM AFO travel route network is the 2004 road inventory. Similar to the surrounding national forests, the major change in motorized travel designations is from ‘Open’ to ‘Limited to Existing or Designated Routes’.

Under the Preferred Alternative, an OHV management area (80 acres) would be ‘Open’ to motorized travel. The area ‘Closed’ to motorized travel is only 4,625 acres. Cumulative adverse effects on motorized travel and public access for the Preferred Alternative are moderate to major, when considered together with (reasonably foreseeable) management on surrounding land—due to imposition of a designated routes network. However, most limitations associated with BLM resource programs would be temporary, small scale and local.

Beneficial cumulative effects on travel would be from trail development and temporary road construction associated with vegetation management activities. For the Preferred Alternative, 25.5 miles of non-motorized trails would accommodate increased demand for non-motorized uses. When considered along with plans for adjacent federally administered lands, it would result in moderate beneficial effects to non-motorized travel resources.

There are presently no (known) actions on private lands that would adversely affect travel opportunities--except during the hunting season when some landowners lock gates on private land providing access to public lands. There are no actions, since the 2004 route inventory, that have had, or are likely to have, cumulative effects on public access or the travel route network.

#### **4.17.8 Mitigation Measures**

Mitigation for OHV recreation—though not for access—include three OHV management areas, which includes a 15 mile trail specifically designed for recreational driving.

#### **4.17.9 Unavoidable Adverse Impacts**

The major unavoidable adverse impact is the change from ‘Open’ OHV designations to a route network with ‘Limited’ designations, where OHVs must stay on existing or designated roads and trails.

#### **4.17.10 Short-Term Uses Versus Long-Term Productivity**

Short-term uses include 81 miles of seasonal motor-vehicle road closures that would have minor adverse effects on travel. However, such closures yield long-term productivity benefits from enhancement of soils, water, wildlife, vegetation, and protection of cultural resources. Overall, reasonable and proper restraints on OHV use imposed by BLM would generate a positive public image regarding all kinds of back-country travel from protection and enhancement of public land resources.

**4.17.11 Irreversible or Irretrievable Impacts**

There are no irreversible or irretrievable actions or impacts.

## 4.18 Potential Effects on Vegetation

This section describes potential effects on vegetation—direct, indirect, and cumulative—as a result of implementing proposed management actions under the Preferred Alternative. Of special concern are shrub-steppe communities, riparian/wetland communities, and unique and rare plant alliances (curlleaf mountain mahogany, quaking aspen, and oak woodlands.) Management actions have the potential to produce changes in the composition of vegetation communities—most importantly, changes dealing with noxious weeds, relative abundance of individual species within plant communities, vegetation structure and groundcover, and distribution of plant communities in the landscape. Changes in vegetation affect other resources, especially soils, water quality and quantity, health and abundance of wildlife, preservation of cultural resources, and the quality of recreational experiences.

Direct and indirect effects of management actions can be short-term (i.e., typically an immediately observable change whose major effects last for weeks or months) or long-term (i.e., typically changes occur over many months or years and are not immediately observable), these apply to and depend on site re-vegetation potential following disturbance. Direct effects on vegetation are generally caused by vegetation treatments: timber harvesting; construction and maintenance activities; use or closure of roads and trails; foraging and trampling by livestock, wild horses, and wildlife; wildland fires and fire suppression activities; energy and mineral development; herbicide applications; seeding and planting; and the introduction, proliferation, and treatment of invasive plants and noxious weeds. Indirect impacts are also associated with surface-disturbing activities. A typical example would be invasion by exotic annual grasses and other noxious weeds. Another prevalent example would be changes in species composition or abundance resulting from modified nutrient cycling as a result of soil compaction, accumulation of livestock urine and feces, erosion caused by livestock, and nutrient modification and soil loss (or deposition) associated with fire. Indirect effects can also be beneficial, such as special area designations (ACEC or RNA). The total effect of vegetation manipulation and range improvement projects can eventually alter the plant community's successional trajectory.

Livestock distribution patterns can increase or decrease their effects on the landscape, depending on location and density. If livestock are concentrated in small areas or along fence lines, soil disturbance from trampling would be greater in those areas, resulting in elimination of vegetation and invasion by noxious weeds. In particular, vertisols (which exhibit shrink-swell characteristics) are at high risk of degradation from this cause. These soils are prone to invasion by exotic annual grasses—for example, many sites in the AFO management area previously occupied by low or Wyoming sagebrush are now dominated by medusahead. Concentration of livestock and wild horses in riparian areas can lead to destruction of stream banks, which is likely where alternate water supplies are not available or exclosures are not used.

OHVs can remove vegetation and cause erosion. Concentrated or oft-repeated OHV activities can strip land of native plants, cause gulying and off-site sedimentation, and can introduce and spread noxious weeds.

Management activities likely to have the greatest effect on vegetation in the AFO management area are associated with fire (wild and prescribed), grazing, roads, surface mineral extraction, juniper removal, hazardous fuel reduction, recreation, and utilities.

### **4.18.1 Methodology and Assumptions**

Effects are considered adverse if they result in: loss of numbers such that species abundance or biological diversity is affected beyond the limits of normal variability; harm to a species, plant community, or habitat recognized for scientific, ecological, recreational, or commercial importance; alteration or destruction of a native biological community to the degree that it is prevented from returning to its natural ecological state.

Effects are considered beneficial if they result in the maintenance or restoration of: vegetation communities with sufficient diversity in species composition and age class structure to support normal nutrient cycling and energy flows as well as vigorous growth and adequate distribution to ensure reproductive success and recruitment when favorable events occur, thus permitting recovery from localized catastrophic events; or conditions where plant communities reflect the desired plant community (DPC) or potential natural community (PNC) appropriate for the site.

The following parameters and assumptions are identified regarding changes in vegetation resulting from natural events or human interventions:

- Increases or decreases in overall vegetation cover; namely, the proportion of ground surface that has living plant material directly above it.
- Increases or decreases in the total number of plant species occurring within a discrete area, i.e., “species diversity.”
- Changes to the pattern of plant distribution (i.e., uniformity versus patchiness) for individual species, successional stages, or plant associations: this is described as “community diversity,” with an increase in patchiness being a positive or “higher” state.
- Variety in the shape, size, density, and age of vegetation, i.e., “structural diversity.”

Reduction in structural diversity and ground cover often leads to increased soil erosion. Soil erosion rates on shrub-steppe communities are highly dependent on the proportion of soil surface protected by vegetation from raindrop impact. Erosion rates increase exponentially as plant cover decreases (Meeuwig, 1970).

Prescribed burns are designed to produce a mosaic of islands and stringers of unburned vegetation in order to maintain connectivity and promote structural diversity in wildlife habitats. Wildfire events may accomplish this objective, but because wildfires generally occur when conditions are hottest and driest, large areas are often burned instead of the desired mosaic of burned and unburned areas.

Proposed management actions have the potential to affect vegetation differently in terms of the relative abundance of species within communities, the relative distribution of plant communities, and the relative occurrence of seral stages of those communities. However, implementation of any one treatment would not result in the complete elimination of a plant species, plant community, or seral stage.

Treatments under the category of ‘shrub-steppe/shrub communities’ are plant communities described or mapped as shrub or shrub/perennial grass-dominated communities (i.e., mountain big sagebrush or ceanothus chaparral)—presently being invaded by western juniper. Juniper should have no more than 20% canopy cover in such communities. Treatments described for ‘juniper’ are plant communities mapped as juniper woodlands or communities where juniper canopy cover is in excess of 20%; these juniper woodlands are less than 150 years old. Treatments for these communities overlap with fuel reduction treatments; therefore, restoration and rehabilitation of shrub communities also satisfies objectives for the reduction of fuels.

#### 4.18.2 Incomplete or Unavailable Information

Current vegetation mapping system for the AFO is CALVEG (USDA Forest Service, 1981.) Resolution of the CALVEG system is very coarse and does not accurately portray existing conditions for much of the shrub and woodland community types in the AFO management area. Also, CALVEG does not map many riparian communities due to limitations imposed by the minimum mapping unit. Vegetation inventory, refinement of the present classification system, and additional mapping are required before BLM can properly develop resource or management objectives for plant communities and land health standards, and their relationship to sage-grouse habitat and 'R-value' correlation—as well as other vegetation and wildlife habitat issues.

#### 4.18.3 Analysis

Levels of effects on vegetation are defined as follows:

**Negligible:** Native vegetation would generally not be affected; however, if some individual native plants are affected, effects would be small-scale and not discernible for any native plant community—including special status plants.

**Minor:** Actions would affect some individual native plants and would also affect a relatively minor portion of the plant community. The use of standard operating procedures to offset adverse impacts—including measures to protect special status plants—would be required and almost certainly successful.

**Moderate:** Actions would affect numerous individual native plants and would also affect a sizeable segment of the plant community over a relatively large area. The use of standard operating procedures to offset adverse effects could be extensive but procedures would probably be successful. Special status plants could be adversely affected.

**Major:** Actions would produce large changes to native plant populations—including special status plants—and effects would cover a relatively large area. Extensive use of standard operating procedures for offsetting adverse effects would be necessary, and their success would not be assured.

**Short-term:** Anticipated effects occur within 1 to 5 years of implementation.

**Long-term:** Effects generally occur after the first five years following treatment and persist for as much as 20 years (within the life of this RMP.)

#### 4.18.4 Impacts Common to All Vegetation Associations

Construction of facilities, such as water developments (reservoirs, wells, and springs), fences, roads, campgrounds, interpretive sites, bio-engineering projects, and mineral extraction sites involves crushing and uprooting vegetation in the immediate vicinity and along vehicle access routes. Most impacts from construction are direct, short-term, and limited to the immediate project area. In the long term, facility development can have indirect impacts as a result of greater use by or for livestock, wild horses, recreation, and administration at the site and along roads and fences. Greater use can compact soils, reduce vegetation cover, and cause dust to accumulate on vegetation. These effects can lead to the death of plants or reduction in vigor, and produce conditions favorable to the establishment and spread of noxious weeds.

Standard operating procedures would be integral to activity and project level planning. These include resting burned areas (wildfires and prescribed burns) from livestock grazing, re-seeding, and juniper reduction.

Unregulated OHV traffic, roads created by wood cutters, and livestock grazing could negate all beneficial effects from vegetation manipulation and habitat restoration efforts. Adverse, long-term moderate to major impacts would be the introduction of exotic annual grasses and other noxious weeds or invasion by undesirable early seral stage vegetation that can out-compete native plants or prevent seedling establishment.

Cultural resources management actions could result in varying degrees of loss, or short-term disturbance, of vegetation communities. These communities may also be affected by construction of interpretive sites and enclosures. Avoiding special status plants or controlling noxious weeds would mitigate adverse impacts to these resources. Compliance with Section 106 of the NHPA could benefit vegetation by restricting, eliminating, or modifying livestock use, construction activities, energy development and surface mineral extraction, but may also prevent large-scale vegetation manipulation projects.

The presence of significant cultural or historical resources could harm vegetation in the long-term by preventing the use of prescribed fire and mechanical methods to restore or rehabilitate degraded sagebrush, chaparral, and oak or juniper woodland communities.

Actions associated with the fire and fuel management programs would result in substantial effects on vegetation communities. Effects may be adverse or beneficial in the short and long term. Prescribe burns would create a mosaic pattern of islands and stringers, creating structural diversity. Wildland fires may also exhibit these patterns as a result of a mixed-severity fire regime (Agee 2004.) However, because of medusahead, cheatgrass, and other exotic annuals, large areas are often uniformly burned instead of the desired mosaic pattern. Also (as discussed in the soils section of this RMP), the reintroduction of fire as a disturbance mechanism for plant community development would reduce the occurrence of catastrophic range and woodland fires and result in more productive rangelands. There would be less soil degradation and less potential for type-conversion to undesirable conditions.

Mechanical disturbance or removal of vegetation during fire suppression activities (i.e., construction of firelines, safety zones, use of heavy equipment and extensive use of existing roads or creation of new vehicle access routes) would have mostly short-term adverse impacts. If a local resource adviser is not on-scene when wildfires occur on BLM-administered lands within the CDF direct protection area—and the requisite coordination meeting between BLM and CDF does not occur annually—impacts from suppression activities could have long-term adverse effects on vegetation, as well as to soils and cultural resources.

An emergency stabilization and/or emergency rehabilitation plan would be developed for all wildfires (BLM Handbook H-1742-1, Burned Area Emergency Stabilization and Rehabilitation, DOI BLM, 2006; Departmental Manual, 620 DM 3, May 2004). Burned areas would be rested from livestock grazing for at least two growing seasons. Development of local native seed caches and a local or regional programmatic emergency stabilization and/or emergency rehabilitation plan, developed at the landscape level prior to wildfire occurrence, would result in beneficial long-term impacts for vegetation.

Because soils support vegetation, maintenance of healthy, productive soil is required to meet management goals for vegetation. Objectives of the soil resources management program promote the long-term health and productivity of soils. Standard management actions that affect native plant communities include temporary or permanent exclusion of livestock from soils that are highly erosive and/or are not meeting land health standards, seeding with selected native and desirable non-native species, closing and rehabilitating selected roads, minimizing new road construction, and minimizing ground-disturbing activities (such as use of heavy machinery near perennial and intermittent drainages or where soils are not in PFC.)

Although some standard management actions may result in minor undesirable direct, short-term effects on vegetation through surface disturbance and subsequent vegetation removal, the long-term result of these actions would be an increase in soil productivity and site stability. Increased soil productivity and site stability benefit vegetation through maintenance and improvement of hydrologic function, chemical and biological soil development processes, and increasing nutrient cycling.

The habitat (vegetation) management program identified for terrestrial and aquatic wildlife overlaps many actions identified for the vegetation management program. Actions focus on protecting, enhancing, and restoring the diversity and distribution of desirable plant communities, providing for their continued existence and normal function, and restoring degraded landscapes and decadent communities. Management of vegetation for the benefit of wildlife is also beneficial for plant communities.

Noxious weeds occupy a small portion of the planning area and grow mainly on disturbed areas adjacent to roads and riparian corridors (springs, streams, reservoirs.) They replace native plants and, over time, some species can change the ability of a site to support the native plant community. Chemical, biological, and mechanical control of noxious weeds causes negligible short-term adverse effects on native vegetation by subjecting native plants in the immediate area of control to the same treatment as the weeds. With the exception of the Dodge Springs area, the present level of noxious weed infestation is small. Therefore, direct short-term adverse effects to native species are small. Controlling noxious weeds before they occupy large parts of the planning area would result in major long-term benefits to vegetation.

More than 122,000 acres of land that was previously shrub-steppe, riparian, aspen, native grassland, or mixed oak/chaparral are now dominated by juniper in excess of 21% canopy cover. These communities would be treated using prescribed fire, mechanical and manual treatments, herbicide application, resting from livestock or other human-caused disturbances. This would be followed by seeding with species appropriate for wildlife and livestock. There are 82,666 acres at risk from type-conversion to juniper woodlands. Similar treatments would be used to maintain or restore the PNC or DPC in these communities.

At least 38,000 acres of old growth western juniper would be protected from vegetation manipulation. These unique communities are little understood but presumed to be very important for the ecological and genetic stability of arid land ecosystems (Miller, Tausch and Waichler, 1999.) The AFO would protect selected stands in ACEC/RNAs, reduce fuels in adjacent plant communities, and maintain and enhance old growth juniper woodlands. If additional old growth stands are located through vegetation mapping, these would also be considered for protection.

There are approximately 39,000 acres dominated by exotic annual grasses and over 4,000 acres of low sagebrush is at risk of type-conversion to medusahead. Most Wyoming sagebrush (9,000 acres) is also at risk of type-conversion to medusahead. These plant associations, along with more than 10,000 acres of low sagebrush, have a fire return interval of 10 years or less. There is a high potential for stand-replacing wildfires to totally convert these habitats (critical for sage-grouse and pronghorn) to plant associations dominated by medusahead. There would be major long-term adverse impacts if restoration—including creation of firebreaks—is not attempted in these plant associations. Beneficial impacts would range from minor to major depending on the extent and success of treatments as well as follow-up maintenance or other required treatments.

The CALVEG layer for mountain big sagebrush, low sagebrush, bitterbrush, curlleaf mountain mahogany, ceanothus mixed chaparral (including birchleaf mountain mahogany), and other eastside pine/sagebrush associations does not give an accurate estimate of the size of these communities. It is assumed that more than 40% of these communities are at risk of or have been converted to exotic annual grasslands (primarily cheatgrass and medusahead) or to decadent woody vegetation.



Few methods are effective in restoring these communities. Tightly controlled livestock grazing, prescribed fire, and seeding of native plants—coupled with full suppression of high-intensity wildfires—can slow, and in some cases reverse, type-conversion to exotic annual grasslands. However, herbicides and other chemical compounds effective in selectively controlling annual grasses may soon prove safe and effective for use on public lands.

Sagebrush-steppe restoration would result in short-term minor adverse effects on some native plants and special status species due to direct mortality from prescribed burns, herbicide application, or seeding (drilling) treatments. However, successful projects would lead to long-term moderate to major beneficial effects. Project-level design would help limit off-site impacts—such as adverse effects on non-target vegetation. Herbicides would be selected specifically for targeted species and applied in limited areas by certified applicators. Prescribed fires would follow pre-approved burn plans to strictly control conditions under which fire is used. The risk of type conversion and subsequent loss of ecological diversity and site stability that would result without restoration or rehabilitation treatments would pose major long-term adverse impacts.

The goal of the water resources program is to ensure that streams, wetlands, springs, and uplands are in hydrologic PFC. Standard management measures used to achieve this goal include: adjustments to grazing management strategies, creating maximum utilization levels for herbaceous and woody riparian vegetation, controlling the amount and degree of stream bank trampling by livestock, and general implementation of BMPs. Bio-engineering projects in ephemeral and perennial drainages have direct short-term adverse impacts on vegetation. Although some water resources management actions would have direct, short-term adverse effects due to surface disturbance or vegetation removal, long-term effects of water resource management actions—particularly on riparian and wetland communities—is expected to be beneficial.

Wild horses can have substantial adverse effects on vegetation if left unchecked. Typically, they tend to congregate around riparian areas, wetlands, and springs. Because they are on-site all year, they can easily over-utilize these sites and have done so, creating significant adverse effects on vegetation. Although most horse herds currently exceed their AML, management actions would manage herds at or below AML, thus achieving beneficial effects for native vegetation.

Because most of the AFO management area is ‘Open’ for mineral leasing as well as locatable and saleable mineral extraction, the energy and minerals program would affect vegetation in most areas. WSAs would be withdrawn from mineral entry and ‘Closed’ to collection of decorative rock.

Outside WSAs, decorative rock collecting has minimal direct effects on vegetation through alteration of microhabitats and direct disturbance of soils and vegetation by vehicular traffic. However, there may be long-term adverse effects may accrue to biological crusts, including crustose lichens. A significant indirect effect of decorative rock collecting can be an increase in OHV traffic and thereby disturbing soils and vegetation and introducing noxious weeds.

Mineral extraction may adversely affect vegetation in the short and long-term directly through removal, road construction, and degradation of soils. Recovery may be slow or incomplete. Surface-disturbing activities from saleable mineral extraction would require rehabilitated following extraction. Rehabilitation would consist of returning stockpiled topsoil, re-contouring disturbed lands, and restoring the original native vegetation community whenever possible.

As described in Chapter 2.17 “Vegetation” for shrub-steppe/shrub communities, the goal of rehabilitation is to reestablish the physical and biological components of the indigenous plant community in order to develop a stable system capable of performing the functions of the original ecosystem (Newton and Claassen, 2003.)

Successful rehabilitation would have long-term minor to major beneficial impacts, including the ability to resist soil erosion and noxious weed invasion. Improperly applied, rehabilitation would have short- and long-term adverse impacts on vegetation and other resources.

Forestry practices in the AFO management area are limited to commercially viable forests and plants. The AFO would continue to manage multiple resources on forestlands using a variety of silviculture practices. Although silviculture may result in direct short-term adverse effects through disturbance, removal, or alteration of plant communities; beneficial long-term effects are likely for understory vegetation and increased health of the plant community generally, plus reduction in the potential for catastrophic wildfires. Forestry practices techniques would be similar to those utilized for juniper reduction; these effects would therefore be similar.

The S&Gs would apply. As discussed in Chapter 2, adherence to these standards and guidelines would ensure site productivity, maintenance, or restoration of natural watershed function and water quality in compliance with state and federal standards. Compliance would also result in natural nutrient cycling and energy flow, properly functioning of wetlands and riparian areas, communities composed of desired species (including native, special status, and desirable non-native species, when applicable.) Effects of grazing management decisions are complex and can be adverse or beneficial--depending on a multitude of factors. However, for grazing allotments failing to meet land health standards, grazing practices would be altered so that standards can be achieved.

In addition to the S&Gs, vegetation would benefit from site-specific guidelines, constraints, or stipulations on use (see Chapter 2.17). These include resting burned areas for at least two growing seasons, not salting within ¼ mile of springs, meadows, streams, aspen stands, or sensitive plant habitats. Considerations would include monitoring to ensure that restoration and rehabilitation projects are effective in moving plant communities toward the desired future condition. Proper timing and intensity of livestock grazing would help maintain or improve rangeland condition.

Livestock grazing is easily controlled; however, this is not the case for wild horses and wildlife in terms of frequency, season, and duration of use. The controllable factor for these groups is intensity of use, which depends on animal numbers. BLM has the authority and responsibility to control wild horse numbers in order to maintain a thriving natural ecological balance. BLM cannot control wildlife numbers.

Where adjustments to grazing systems cannot mitigate the destructive influence of livestock on special habitats, additional livestock and wild horse exclosures must be built to protect vulnerable vegetation.

Water developments for livestock, wild horses, and wildlife—including wells, springs, and associated spring-source exclosures—have short-term adverse impacts generally limited to the immediate project area. Effects on riparian vegetation are a result of fence, pipeline, and trough construction. In the long term, properly built and maintained exclosures benefit vegetation and soils by protecting them from heavy grazing, trampling, and compaction.

Recreation activities are likely to affect vegetation as a result of soil disturbance and subsequent trampling of vegetation. Impacts would be moderate in the short-term and minor to moderate in the long-term.

Currently, OHV use is low to moderate, but has the potential for major adverse impacts on vegetation. OHV use in the AFO management area is expected to rise during the life of this RMP. Appropriate restrictions on OHV use would benefit native plant communities vulnerable to this use. Unregulated OHV use, however, would lead to an escalation of effects and increasingly severe, long-term impacts. The AFO would manage WSAs (56,648 acres) so as not to impair wilderness values and will limit OHV use in areas subject to resource damage (i.e., soil erosion and noxious weed invasion.)

The Cinder Cone OHV management area (80 acres) would be 'Open' to OHV use. In that area, soil impacts from cross-country use may occur, such as soil exposure, erosion, and loss of vegetation. The 'Open' designation is limited to a small area that has historically been used for this activity, and no additional impacts on soil resources are anticipated. Confining off-trail OHV use to this area and limiting OHV use generally to designated or existing roads and trails throughout the remaining area would have major short-term and moderate long-term benefits—especially to the Hogback Ridge area, which is severely degraded (active erosion, elimination of native and seeded plants, noxious weed infestation, and disruption of permitted livestock operations) from unregulated OHV use.

Recreation activity, in general, can lead to surface disturbance, trash accumulation, trampling and destruction of vegetation, and spread of noxious weeds. Where recreation is properly managed (e.g., restricted to appropriate activities and locations), adverse effects on vegetation can be minimized or avoided. Specific management actions with potentially negligible to moderate adverse effects include new trail and campground construction, vehicle turn-outs, and roads, with short-term effects from construction and long-term effects from use of these areas. Measures would be taken to minimize short-term adverse effects. Interpretive areas would have negligible to moderate adverse impacts in the short term; but ultimately, long-term minor to moderate positive effects would result from their development.

Recreation management decisions with potential to benefit soils include closure of roads where adverse ecological impacts are occurring, plus emergency vehicle closures where it is apparent that OHVs are or will cause significant adverse effects on soils. These actions will reduce disturbance of soils where they are or will become degraded as a result of this activity. This will have beneficial effects on soils, speeding recovery and attainment of PFC in affected areas.

Disturbance associated with utility, transportation, and telecommunications corridors would result in direct short- and long-term disturbance of vegetation communities. Although direct disturbance would affect vegetation through direct removal, the most adverse effect is the potential for introduction and spread of noxious weeds.

### 4.18.5 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor to moderate adverse effects to vegetation, and moderate to major beneficial impacts. In addition to impacts resulting from management activities concerned with cultural and paleontological resources, there would be additional localized, but negligible, long-term impacts from the construction of 12 interpretive sites and the increase in vehicle and pedestrian traffic that would bring.

With respect to fire management under the Preferred Alternative, a full range of fire suppression options would be available for a large portion of the management area (486,047 acres). A small area is designated for wildland fire use. This would result in reduced potential for catastrophic wildfires.

The area proposed for fuel treatments (up to 150,000 acres over the life of this PRMP) would help promote a natural fire regime, and therefore more productive rangelands, with mixed seral classes and less-decadent shrublands.

Four ACECs/RNAs are proposed for the protection of rare and unique plant associations: Timbered Crater (17,896 acres), Mount Dome (1,510 acres), Old Growth Juniper (3,115 acres), and Mountain Peaks (3,500 acres.) Unique plant communities, including Baker cypress, knobcone pine, northern basalt vernal pools, mountain big sagebrush/bluebunch wheatgrass-Thurber's needlegrass, ponderosa pine, old-growth curlleaf mountain mahogany and old-growth western juniper, would be protected and available for scientific study. ACEC/RNA status would result in minor to moderate long-term beneficial effects to these plant communities.

Rare plant communities, special status plants, and plant communities of local concern would be classified and mapped on (up to) 5,000 acres annually under this alternative. This would have long-term moderate benefits for management of these communities. Once location, size, and ecological condition are known, resource objectives and goals can then be established. This could result in designation of additional ACECs/RNAs to protect unique and rare plant associations.

Juniper management control would involve 5,000 acres (over the life of this RMP) that would be manually treated and 100,000 acres that would be treated with prescribed fire. There would be additional moderate short-term adverse impacts. However, the benefits of habitat restoration would prevail in the long term.

A relatively small area would be treated with prescribed fire under the Preferred Alternative. A combination of hand treatments and prescribed fire would not keep pace with the rate of juniper expansion. As a result, juniper encroachment and closure of already-dense canopies would outweigh any benefits from treatment. Chemical treatments would be greatest under the Preferred Alternative (up to 2,000 acres yearly.) Adverse effects would be short-term because of strict adherence to BLM policy and standard operating procedures. Long-term benefits would be enhanced recovery of native plant communities.

All available treatments would be used to enhance, rehabilitate, and maintain multi-aged stands of bitterbrush: removal of juniper, seeding/planting in degraded stands, mitigation of late-season grazing (livestock exclusion or changing season of use), and reduction of grass fuels—especially cheatgrass—in and adjacent to bitterbrush stands. Up to 500 acres would be treated yearly. Livestock and deer would be excluded from seeded areas for 3 to 5 years. Replanting after wildfires would result in moderate to major, long-term benefits to bitterbrush stands.

Impacts to oak woodlands would result from up to 5,000 acres/year being treated by prescribed fire. Larger treatment areas would provide canopy gaps. This would aid recruitment (Fry, 2002), encourage mixed-aged stands, reduce insects, and discourage competition from conifers (FEIS, 2005.) There would be moderate, short-term adverse impacts from fires (direct effects from fire and fireline construction) and minor to major, long-term beneficial impacts to stand sustainability.

The Preferred Alternative provides additional treatment modalities (but including the use of herbicides) to promote seedling and sapling survival for curlleaf mountain mahogany. In older, decadent stands, a combination of low-intensity burns and bulldozing would be used.

Fire would be used to create conditions favorable for seedling establishment. Bulldozing, selective shearing, and pruning would be used in combination to promote seedling survival (Davis and Brotherson, 1991; FEIS, 2005.) Maintaining taller vegetation adjacent to treated stands (such as mountain big sagebrush) would also aid seedling survival (Schultz, et al, 1996.) There would be moderate to major, short-term adverse impacts on mahogany and non-target vegetation, but long-term minor to major beneficial impacts to mountain mahogany stands.

Cutting and burning—separately or in combination—would be used in aspen stands with conifer encroachment to create early succession conditions. Cutting and burning is beneficial because it promotes ‘suckering’ and creates diverse, multi-aged stands (Shepperd, 1996.) Also, changing livestock class of use from cow-calf pairs to dry heifers would result in further beneficial impacts, with some minor short- and long-term adverse impacts. Benefits to livestock producers would be minor to moderate in the long-term. Beneficial impacts to aspen and associated herbaceous vegetation would result because virtually all aspen stands would be rejuvenated.

Degraded rangeland would be restored using a step-by-step process beginning with herbicide application for control of exotic annual grasses, and depending on the site, prescribed fire. This would be followed by seeding with locally adapted native and desirable non-native annual and perennial species (permitted under the CA-BLM native plant policy.) Finally, ‘greenstrip’ firebreaks would be created to protect rehabilitated areas from catastrophic (stand-replacing) grass fires on critical pronghorn and sage-grouse habitats (i.e., low sagebrush and Wyoming big sagebrush communities at risk of type-conversion.)

The Preferred Alternative promotes an ecological approach to the restoration of sagebrush-steppe and mixed chaparral communities by approximating the natural fire regime in these fire-dependent alliances, plus other measures, to encourage succession toward the desired plant community. Long-term beneficial effects on habitats would outweigh adverse impacts from herbicide use. The effects of herbicide use would be short-term because of strict adherence to BLM policy and standard operating procedures. Beneficial effects on habitats would also outweigh any adverse effects from the introduction of desirable—non-native—grasses and forbs introduced to plant communities dominated by exotic annual grasses—especially medusahead.

Construction of almost 2,400 acres of permanent exclosures would result in long-term moderate benefits to vegetation. However, there could be minor to moderate adverse impacts to the structure of plant communities. Seventy-five water developments, primarily for the benefit of wildlife and livestock, would be built over the life of this PRMP. These projects would have long-term benefits for vegetation by reducing livestock concentration around existing developments. Considered as a whole, the above-mentioned treatments would result in moderate benefits to vegetation over the short and long term.

The Red Rock (horse) herd (AML 16 to 20 animals) and the Devil’s Garden herd (AML 10 to 38 animals) would be maintained at their designated AMLs. There would continue to be moderate short- and long-term adverse effects on vegetation, soils, and riparian areas in the Strip Allotment and adjacent Modoc National Forest lands (both managed by the USDA Forest Service), as well as the Red Rock (horse) herd of Siskiyou County.

There would be minor long-term benefits to vegetation from NSO requirements on 10,612 acres ‘Open’ to mineral leasing, from 57,048 acres ‘Closed’ mineral leasing, and from 32,993 acres ‘Closed’ to locatable mineral development. There would also be benefits from a smaller area ‘Open’ to decorative rock collecting.

Area subject to artificial regeneration (8,000 acres)—along with other silviculture practices (prescribed burning, pesticide applications, and biological treatments)—would result in healthy forests and timber-producing areas, and a significant reduction in fuel loads. Although the silvicultural practices used for forest management, which are similar to those used for juniper management, may result in short-term, adverse direct effects on vegetation through disturbance, removal, or alteration of community structure, the long-term effects likely would be beneficial to understory vegetation community health and reducing the potential for catastrophic wildfires.

Maintenance on 28 miles of existing roads and construction of additional permanent (10 miles) and temporary (50 miles) roads would result in minor disturbance to soils and vegetation throughout the management area. Botanical clearances would ensure that unique or rare plant communities are not impacted. Measures to prevent weed transmission and dispersal would be used in all road construction activities. Installation of gates and seasonal closures on 81 miles of roads would have moderate, long-term benefits to vegetation by eliminating vehicle-caused damage during wet conditions.

Recreation management for the Preferred Alternative would involve construction of 3 semi-primitive campgrounds. Camping would be prohibited within 200 feet of a water source, sensitive plant community, or cultural site. Ten to 15 parking areas, 10 to 14 vista sites, and (up to) 25.5 miles of trails for non-motorized use would be built. OHVs would generally be 'Limited to Existing or Designated Routes.' OHVs would be strictly 'Limited to *Designated Routes*' in areas with special resource concerns—such as important wildlife or special status plant habitats, areas with rare plant communities, proposed ACECs, and areas with vulnerable soils or where noxious weed invasion is a special concern. Development of recreation sites would result in moderate to major, short-term adverse impacts to vegetation. Proper management of recreation and closing sensitive areas to motor-vehicle use would result in moderate to major long-term beneficial effects on vegetation.

Vegetation would be managed to achieve land health standards under the Preferred Alternative using site-specific management techniques. General use of site-specific techniques would have definite beneficial impacts. Invasive juniper would be aggressively treated, in order to control or reverse encroachment. The use of fire (AMR, WFU, and prescribed fire) in particular, can be very beneficial to vegetation.

The Preferred Alternative incorporates progressive measures for the restoration and maintenance of vegetation along with management that supports a healthy local economy. All plant alliances, associations, or communities would be managed for a desired plant community or potential natural community (DPC or PNC). Its components were not just selected to foster healthy vegetation, but to provide for human commodity and recreational needs, as well as preserving other valued resources. This alternative uses all available tools, as well as the latest science and technology, to restore and stabilize plant communities at risk of type-conversion to exotic annual grasslands or juniper-dominated woodlands. If such communities are allowed to cross a certain ecological threshold, they can achieve a degenerate and unproductive—but stable—state that is very expensive, if not impossible, to reverse.

### 4.18.6 Cumulative Effects

The area of analysis for cumulative impacts on vegetation is defined as the AFO area boundary. Since European settlement of this area in the mid-1800s, great changes have occurred to native plant communities. The most productive flat-lands (lower elevations and floodplains) became private agricultural lands. The vast majority of meadows adjacent to perennial and intermittent creeks—and many meadows surrounding springs and seeps—also became private lands. The largest of these wet meadows were homesteaded and used to produce hay. Grazing of domestic sheep, cattle, and horses on shrublands around early settlements was frequently heavy and conducted year-round. As a result, herbaceous vegetation at lower elevations around private property was selectively removed. Grasslands were converted to big sagebrush communities. Roads and the practice of livestock trailing/grazing along riparian corridors caused accelerated erosion, gullyng, and eventual loss of meadows. Livestock grazing inadvertently introduced invasive annual grasses which quickly colonized communities with impoverished understories. In more recent years (since the 1940s), aggressive fire suppression has encouraged the expansion of juniper into shrub-steppe communities and special habitats. The combination of livestock grazing and aggressive fire suppression has also lead to an increase in decadent shrub communities with little herbaceous understory vegetation at higher elevations.

In studying the dynamics of sagebrush-steppe ecosystems over time, major cumulative impacts are in evidence today. Since cattle, sheep, and horses were introduced to the planning area 150 years ago, major changes have taken place, due in large measure to changes involving fire and livestock grazing practices. The most drastic effect on a landscape has resulted from prevention of wildland fires and the accidental introduction of noxious weeds, especially exotic annual grasses (such as cheatgrass and medusahead.) The altered understory and fire regime, plus accelerated soil erosion, have caused many areas to decline to the point where the native perennial plant community can no longer achieve dominance.

The major cumulative impacts to sagebrush-steppe vegetation are loss of late seral-stage communities, destruction of understory and perennial vegetation, loss of biodiversity, and conversion to marginal and degraded communities below the threshold for possible restoration. However, annual grasses are still components of most lower and mid-elevation plant communities as well as on clay-containing soils. These communities—particularly low and Wyoming big sagebrush—are at risk of type-conversion to cheatgrass and medusahead in the aftermath of wildfire. Juniper continues its encroachment in shrub-steppe communities and special habitats. In the absence of disturbance (fire and/or mechanical), juniper-invaded communities, communities dominated by exotic annual grasses, decadent big sagebrush communities and juniper-invading communities will remain in moribund condition due to reduced biodiversity. Within the last 25 years, invasive, noxious weeds have noticeably increased, primarily on private lands, on roadsides, along riparian corridors, in areas of heavy livestock use, and where recreational activities are concentrated.

The major cumulative impacts to riparian/wetland vegetation are habitat destruction or loss, conversion to marginal habitats, and loss of habitat connectivity. Habitat loss can result from upstream impacts on lands owned by others, from forest stand conversion, water channel alteration, water withdrawal, road construction, and vegetation treatments.

The cumulative effects of conversion on riparian/wetland habitats, in combination with BLM's proposed alternatives, could have major impacts on special status and other wildlife dependent on these habitats. Private landowners have drained and converted some wetland habitats to create livestock forage and pasture. Channelization and irrigation water withdrawal on private lands have altered flood and late-season water flows—which has adverse effects on lower stream reaches and wetland function. On the other hand, some private landowners have implemented wetland restoration projects resulting in restored riparian/wetland function at these locations.

Actions having a cumulative effect on watershed function—especially relating to watershed ability to capture, store, and slowly release water—would effect riparian and wetland vegetation. On USDA Forest Service-administered lands, and on private lands at higher elevations in shared watersheds, forest management practices such as commercial and pre-commercial thinning, partial-cut and sanitation, salvage sales, prescribed burns, and wildland fires, would cause adverse impacts downstream.

Impacts on vegetation from activities implemented on adjacent private, state, and federal lands would primarily involve fire management and recreation. Closure of roads and OHV use can have significant impacts on shrub-steppe communities. Loss of habitat due to noxious weed invasion can cause severe losses to sagebrush communities. Integrated weed management efforts *involving all landowners* is important for preventing the introduction, establishment, and spread of noxious weeds.

Primary impacts on vegetation will occur from livestock grazing, (increasing) recreational activities, and vegetation restoration. Effects tend to be concentrated around water sources where livestock come to drink and visitors come to camp, hunt, and fish.

Livestock grazing, especially in these areas, would be monitored and controlled so that public lands meet rangeland health standards for upland soils, water quality and in-stream flows assured, riparian and wetland areas preserved, and biodiversity in general is protected.

Adverse impacts from recreational activities would be controlled by managing access—primarily by managing seasonal timing and areas ‘Open’ to access by OHVs. Adverse impacts from vegetation restoration projects are short-term, with much greater long-term benefits. However, there will be isolated areas and times where vegetation will receive major adverse impacts.

Over the next 20 years, major uses are likely to continue—and in some cases increase—in the following manner or for the following reasons:

- Livestock grazing would continue to impact almost 98% of the management area, while actual grazing use, and its effects, will depend on the grazing system employed.
- Fish and wildlife habitat development and use are expected to continue at current or increased rates--depending on the health of terrestrial vegetation and habitat conditions.
- Mineral exploration and production are not expected to increase due to the lack of mineral resources, excepting sand and cinders.
- Outdoor recreation in general is expected to increase as urbanization and development continue in nearby cities and towns and people discover this area in greater numbers.
- Timber production would continue at current, or lower, levels and may become more of a fuel management activity than a commercial enterprise.
- Wild horses would be maintained at viable population levels (i.e., within AMLs.)
- Wildland fires will continue to effect vegetation and landscapes; requiring, at times, emergency stabilization and rehabilitation.

### **4.18.7 Mitigation Measures**

Mitigation measures will be required in such cases to ensure continued land health. Activities and decisions driven by this RMP must be conducted so as to ensure BLM’s ability to mitigate damage, maintain healthy lands, and restore vegetation and landscapes that are unhealthy, compromised, or at risk.

### **4.18.8 Unavoidable Adverse Impacts**

Monitoring and application of the land health standards could temper excesses of use and/or consumption—otherwise significant adverse impacts would be unavoidable.

### **4.18.9 Short-Term Uses Versus Long-Term Productivity**

Areas at lower elevations and lower precipitation levels must not be permitted to become so degraded that they are allowed to cross critical ecological thresholds from which they are unlikely to recover (or can be recovered only with great difficulty.) Such areas are at risk of type-conversion to unproductive plant communities—especially non-native grasslands. Long-term productivity impairment could be 40 years or more, in such cases. In areas at higher elevations and higher precipitation levels, similar adverse impacts would result in shorter-term impairment—but still 20 years or more. For these reasons, timely and aggressive intervention will be required to preserve productive, native plant communities and prevent this from happening.



**4.18.10 Irreversible and Irretrievable Impacts**

With proper management, vegetation should not be subject to irreversible or irretrievable impacts.

## **4.19 Potential Effects on Noxious Weeds and Invasive Species**

Potential impacts on vegetation from undesirable invasive plants and noxious weeds are described in this section. Effects are described from the standpoint of the Alturas IWM Program. As described in the “Vegetation” sections of this PRMP, proposed management actions will influence the structure, biodiversity, and seral stage of plant communities, associations, and alliances. Most actions have the potential to initiate new infestations and spread or intensify existing infestations. Of special concern are infestations of exotic annuals, invasive western juniper, or conditions which would cause a shift in (plant) community structure from a middle or late seral condition to an early seral stage. This last condition can result in replacement of native vegetation by noxious weeds or other undesirable plants.

### **4.19.1 Methodology and Assumptions**

Information used in this analysis was obtained from the following sources:

- Government agency and scientific literature
- Cooperative weed management areas
- BLM professional judgments
- Interdisciplinary team consultations
- Noxious weed databases
- Fieldwork
- General knowledge of the AFO planning area

The AFO works cooperatively with the Modoc County Weed Management Area Working Group, the Shasta County Weed Management Area, and the Siskiyou Weed Management Area. The introduction and spread of noxious weeds and other undesirable plants on BLM-administered lands have resulted in significant adverse effects, such as:

- Loss of rangeland productivity
- Increased soil erosion
- Reduction in the number of species, and in structural diversity
- Loss of wildlife habitat
- Threats to human safety and health from increased fire danger

The Carson-Foley Act (Public Law 90-583) and the Federal Noxious Weed Act (Public Law 93-629) direct weed control on public lands. To minimize and prevent the spread of noxious weeds during implementation of management actions, the AFO accepts the goals and employs the actions described in Partners Against Weeds (BLM, 1996) and The National Invasive Species Management Plan (National Invasive Species Council, 2001.) These goals and actions include:

- Prevention and detection: Develop a prevention and early detection program.
- Education and awareness: Generate internal and external support for noxious weed control.
- Inventory: Ensure adequate baseline data is available on the distribution of weeds.
- Planning: Include provision for the management of noxious weeds in all BLM-funded or authorized actions.

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- Integrated weed management: Determine the best methods for an integrated approach to weed management, followed by on-the-ground operations. Noxious weed management tools will include a combination of biological, manual, mechanical, and chemical control methods.
- Coordination: Ensure that management of noxious weeds is conducted efficiently, effectively, and consistently across jurisdictional and political boundaries.
- Monitoring, evaluation, research, and technology transfer: Ensure that sufficient data is available to confidently evaluate management actions by providing a basis for informed decisions, assessing progress toward objectives, and developing new and more effective management methods.

In addition to agency-wide BLM policy regarding noxious weed management, the AFO has developed standard management practices related to noxious weeds (see the AFO Noxious Weed Prevention Schedule in Appendix F). This schedule is applied for any management action with the potential to introduce or cause the spread of noxious weeds.

### 4.19.2 Incomplete or Unavailable Information

At the present time, about one-third of the AFO management area has not been inventoried for noxious weeds. Trends in noxious weed infestation are measured in terms of the numbers, status, net area of infestation, and gross area of infestation occupying a certain region. Specific data on these measurements are lacking or incomplete for lands administered by the AFO.

Noxious weeds continue to spread through many avenues of infestation. Because of this, the planning approach to noxious weed management, in some cases, is to determine where and how various resource management actions might conflict with weed-control efforts or spread seeds or plant parts. Mitigation measures must then be considered to eliminate or minimize actual or potential conflicts with the IWM program.

Adequate information does exist with respect to invasive plants and noxious weeds in the following areas:

- General occurrence of populations
- Habitat requirements
- Areas of likely spread
- Plant physiology and likely consequences of management actions

### 4.19.3 Analysis

For the purpose of this analysis, effects that would reduce the introduction and/or spread of noxious weeds are considered *beneficial*; whereas, effects that would result in the introduction and/or spread of noxious weeds are considered *adverse*.

This analysis defines levels of effects concerning the introduction and spread of invasive plants and noxious weeds in the following manner:

**Negligible:** Observable or measurable changes would not usually be apparent. If detectable, effects would be slight.

**Minor:** Very little change would result from the impact. Effects would be barely perceptible and localized, resulting in a slight increase (or decrease) in the number of sites or their distribution. Mitigation measures, if required to offset adverse effects, would be simple and successful.

**Moderate:** Changes would be apparent and effects easily perceptible. Impacts would result in a noticeable increase (or decrease) in the number of sites or their distribution. Changes would occur over a relatively large area. Mitigation measures, if needed to offset adverse effects, would be extensive, but probably successful.

**Major:** Changes would be readily apparent and widespread. Impacts would result in substantial changes to the number of sites or their distribution. Changes would occur over a very large area. Mitigation measures, if needed to offset adverse effects, would be widespread and intensive. Success would not be assured.

**Short-term:** An effect lasting from 1 to 5 years.

**Long-term:** An effect lasting from 5 to 20 years or more.

### 4.19.4 Impacts

All resource programs have the potential to spread undesirable plants and noxious weeds. Preventing introduction and controlling the spread of noxious weeds would always be a priority. BLM's IWM program applies a variety of control methods and acceptable uses, including restoration and rehabilitation measures. Because effects from noxious weed invasion have far-reaching ecological implications for many resource areas, management actions designed to eliminate or control undesirable species are beneficial.

The Alturas Weed Prevention Schedule will eliminate or mitigate adverse impacts from noxious weed invasion. Resource program activities will be assessed and evaluated for noxious weed implications. Depending on the control method used, there will be variable short-term impacts on non-target vegetation. As weeds are controlled and native vegetation returns on sites previously occupied by noxious weeds, productivity and vigor of native plant communities will improve.

Management actions that disturb or compact soils, or remove vegetation, can increase the potential for invasion by undesirable species or noxious weeds, resulting in:

- Degradation to the structure, composition, cover, or diversity of native plant communities
- Soil that is low in productivity or non-productive
- Significant erosion
- Slow infiltration of water (in soils) slow water infiltration; and
- Habitat type-conversion

Once established, noxious weeds are easily spread by many vectors, including:

- Livestock and wild horses
- Construction for range, wildlife, or watershed improvement
- Road maintenance
- Energy and mineral development, especially sand and gravel pits
- Off-highway vehicle use
- Development and use of recreation sites
- Vegetation manipulation from range management and forestry practices
- Archeological and cultural resource management activities

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- Fuel treatments, including prescribed fire
- Wildland fires
- Fire suppression activities and equipment

BLM would conduct risk assessments at the project and activity design stage to determine the likelihood of increasing opportunities for the introduction or spread of noxious weeds. Following risk assessment, BMPs, or suitable mitigation, would be incorporated into the project or activity plan. The type, degree, and extent of land uses proposed for actions may determine the potential for noxious weed spread—as well as control.

Noxious weed management will continue to be a priority throughout the management area in order to protect valued resources. BLM will eliminate or control weed infestations (depending on the size of the infestation) through a cooperative integrated weed management program. BMPs would be prescribed and implemented, at the project and activity plan level, to reduce the risk of noxious weed infestation resulting from degradation of soil and vegetation. This would result in reduced erosion, preservation of water quality, and increasing the mass and diversity of native vegetation. Acquisition of lands could have moderately adverse implications for the weed-control program, if acquire lands have substantial infestations of noxious weeds.

Disturbance resulting from construction and use of cultural resource facilities could introduce or spread noxious weeds in a local area. Interpretive areas can have a minor adverse effect in terms of opening local areas to weed invasion—depending on the degree of visitor use, soils, and vegetation disturbance. Visitor activities in areas outside the planning area could also have a minor adverse effect in terms of introducing weeds to the management area.

There is a close relationship between invasive plants and fire. Wildland fires are widely recognized as a prime cause of noxious weed invasion and proliferation. Weed invasion results from a complex interaction of factors including:

- Level of infestation before the fire
- The presence (or absence) of noxious weeds on adjacent lands
- Introduction of noxious weed seed and plant parts on fire suppression equipment

Commonly, sagebrush and other shrub communities become infested with noxious weeds (typically medusahead and cheatgrass) following fires. Greater invasive plant dominance can increase landscape flammability, and greater fire frequency can increase vulnerability to invasion (Brooks and Pyke, 2001.)

Construction of firelines, fuel breaks, and temporary access roads can introduce noxious weeds into previously uninfested areas. These effects would be avoided or reduced through use of the AFO Noxious Weed Prevention Schedule and other standard weed-management techniques.

Emergency fire stabilization and rehabilitation reduces the risk of weed invasion by reestablishing desirable vegetation on burned sites. However, these activities can introduce or spread weeds via equipment and vehicles or in contaminated seed, hay, straw, or mulch. Mitigation measures would be implemented to reduce these possibilities.

BLM would use standard management measures to achieve desired results in regard to soil stability and productivity. Several of these treatments have implications for noxious weed invasion and encroachment due to direct removal (vegetation manipulation) or indirect causes (seeding, closure and rehabilitation of roads, minimizing new road building, and limiting grazing.)

Although soil management actions involve ground disturbance (which could introduce or spread noxious weeds), standard management measures used to restore soil stability and productivity are beneficial to native vegetation. Actions that promote healthy vegetation enable native vegetation to better resist encroachment and noxious weed invasion.

Limits on OHV use would benefit vegetation communities by limiting direct disturbance of soils and vegetation (thereby decreasing erosion), and indirect disturbance caused by human presence, further limiting the potential for introducing or spreading noxious weeds. As a general rule for most plant communities, OHV use presents a disturbance regime that tends to counteract natural disturbance regimes and processes.

Construction and maintenance of utility and transportation corridors and telecommunications sites are known to be the principal vectors for noxious weed introductions and proliferation in the AFO management area. Although adoption of the Eagle Lake Field Office's noxious weed prevention schedule would reduce the introducing and spread of noxious weeds, it is not totally effective.

### **4.19.5 Analysis of the Preferred Alternative**

The Preferred Alternative would result in negligible to minor adverse impacts to the control of noxious weeds and invasive species, and moderate to major long-term beneficial impacts to native vegetation.

Projects or activities designed to maintain or improve watershed function, rangeland health, and wildlife habitats would incorporate measures to control weeds while protecting or restoring healthy plant communities. Improvements in ecological function and rangeland health increase resiliency and allow native plants to successfully compete with introduced weeds, hindering their establishment. Therefore, weed infestation is less likely under such conditions—though some risk remains. The Preferred Alternative emphasizes early detection and rapid response to noxious weed infestations within four weed management areas—Shasta County, Siskiyou County, Lassen County, and Modoc County weed management areas. Inventory, control, and restoration efforts would be coordinated and implemented cooperatively. This alternative provides the greatest flexibility in fulfilling other resource program needs while not hampering the effectiveness of the IWM program in its efforts to decrease the size and density of infestations, or limit their spread.

Prescribed fire fuel treatments and shrub-steppe/shrub community rehabilitation and restoration projects under the Preferred Alternative could have minor weed-control benefits. Project treatment plans would reintroduce fire (on a limited basis) as a natural component of the ecosystem to enhance renewable resources, and restore healthy ecosystems. However, maximum yearly use of prescribed fire would not exceed 10,000 acres. Another important long-term consideration is the necessity of noxious weed surveys on prescribed burn sites. If these are not conducted annually, weeds that proliferate after fire will go undetected, resulting in moderate to major adverse impacts from invasion of these sites by exotic annual grasses and other noxious weeds.

Mechanical treatments would be an important component of fuel-reduction and vegetation restoration efforts. Mechanical treatment methods would be emphasized under the Preferred Alternative and used to treat as much as 10,000 acres annually. Standard methods for mechanical treatment involve the use of heavy equipment. However, this causes much greater ground disturbance than prescribed fire, chainsaws, intensive grazing by livestock, or herbicides; therefore, mechanical treatment has greater potential for spreading weeds. Effects may be compounded by bringing equipment from outside the management area—which has the potential to introduce new weed species.

BLM would develop best management practices at the project/activity plan level to minimize or mitigate the degree of soil disturbance and the risk of new introductions. The Alturas Weed Prevention Schedule would minimize the spread of noxious weeds from heavy equipment.

Chemical treatments would be conducted on 50 to 2,000 acres annually. Impacts from herbicides would be from spraying exotic annual grasses, noxious weeds, releasing conifer in timber producing areas being encroached by fast growing native shrubs, and stimulating/enhancing decadent sagebrush communities that are not conducive to prescribed burning. Impacts would be beneficial from all these methods by preventing the spread of noxious weeds or undesirable species and by creating a mosaic of age classes of shrubs and stimulating native forbs in sagebrush communities.

Juniper management would involve construction of 10 miles of permanent and 50 miles of temporary roads. Over 15,000 acres of juniper woodlands will be opened to firewood cutting. Other public uses on these roads could also contribute to weed proliferation. Adverse effects from weed introductions and proliferation would be minor to moderate. Impacts from wild horse use are unknown. Wild horses have been reported on the Big Tablelands in Siskiyou County. This land has a small (5 to 20 acres) occurrence of medusahead and has a relatively intact native perennial grass component. Season long wild horse grazing could have both short- and long-term adverse impacts.

The weed control program would benefit from the following OHV restrictions: OHVs would be 'Limited to Designated Routes' in ACECs and on one WSA, and would be 'Limited to Existing Roads and Trails' on the rest of the management area. This action would significantly reduce the introduction and spread of noxious weeds that would otherwise result from off-road travel.

Several resource management programs could substantially affect vegetation resources, directly through removal and/or disturbance and indirectly through modification of one or more ecosystem parameters. The result would be long-term changes in the resource. The relationship between resource management actions and ecosystem parameters is complex and difficult to discern within the context of a large-scale planning effort such as this PRMP. Adding to this are historical events and traditional uses evident and active on the current landscape (e.g., the introduction of noxious weeds and livestock grazing.)

Resource programs with the greatest potential for substantial adverse effects on vegetation—especially from noxious weeds—include recreation; energy and minerals; and utilities, transportation, and telecommunications. By many accounts, invasion and domination by noxious weeds pose ecosystem risks second only to direct loss of habitat from development.

### 4.19.6 Cumulative Effects

The area of analysis for cumulative impacts on noxious weed management is the AFO management area and the four weed management areas of Modoc, Lassen, Shasta, and Siskiyou Counties. Under NEPA, environmental analysis must consider cumulative effects – impacts on the environment resulting from the incremental effects of an action when added to past, present, and (reasonably foreseeable) future actions – regardless of what agency, federal or non-federal, corporate, or private citizen undertakes such actions. A variety of environmental processes and management actions on private lands adjacent to the AFO management area or administered by the USDA Forest Service, USFWS, CDFG, and California State Parks could result in cumulative effects to the planning area from invasive plants and noxious weeds. This applies equally to tribal lands and lands administered by PG&E. Soil and vegetation resources are therefore affected by management actions and environmental processes beyond BLM's direct control. This can have implications for the control of invasive plants and noxious weeds on BLM-administered lands.

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The introduction of noxious weeds is likely to continue for the reasonably foreseeable future. Cumulative effects from weed infestations could result in type-conversion of habitats and loss of native vegetation, certain vegetation types, and some species of wildlife. Riparian/wetland habitats are also at considerable risk from noxious weeds. Soil biological crusts and productivity could easily be lost.

Some of the more important activities and situations on lands adjacent to the AFO management area that have implications for invasive plant and noxious weed management are:

- Conversion of land to agricultural uses (e.g., alfalfa)
- Conversion of land to residential housing
- Invasion of land by western juniper
- Restoration of juniper woodlands throughout northeastern California, southeastern Oregon, and northwestern Nevada
- Fuel treatments
- Logging
- Road building and maintenances
- Increased water use
- Increased outdoor recreation
- Increased incidence of fire (prescribed and wildfire)

Despite the potential, no substantial adverse cumulative effects are expected.

Modoc National Forest is preparing an EIS concerned with eradication and control of 15 noxious weeds on lands it administers. Until the EIS is final and approved, the Modoc National Forest will continue to be a significant source of weed infestation for much of the AFO management area, mostly from vehicle traffic on forest and county roads. Although Lassen National Forest has an active survey, detection, and manual control noxious weed program; the use of herbicides is prohibited. Once the Modoc National Forest completes its noxious weed treatment project EIS, Lassen National Forest will follow suit, with an EIS of their own. An integrated approach with BLM would then permit effective weed management throughout the planning area. An integrated weed management program would include:

- Prevention strategies
- An inventory and early detection schedule
- Multiple tools for weed control
- Research to determine the most effective and efficient strategies
- Follow-up monitoring

The existing cooperative weed management program seeks to minimize weed introductions from outside sources and encourages an integrated and coordinated approach with agencies from adjoining jurisdictions and weed management areas.

### **4.19.7 Mitigation Measures**

Projects approved by the AFO will have a noxious weed clearance before implementation. If an infestation is found, an IWM plan will be developed. The project will include the AFO prevention schedule in order to prevent the introduction and spread of noxious weeds.

BLM will employ the following measures to mitigate adverse effects to the weed-control program:



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- Seed, hay, straw, and mulch used within the planning area must be certified weed-free.
- Equipment from outside the planning area must be cleaned before maintenance is performed, construction activity carried out, and before leaving a weed-infested job-site.
- Fire suppression equipment from outside the planning area must be cleaned of weed seed and plant parts before use in suppression activities.
- Equipment used in weed-infested areas must be cleaned before departure from the site.
- Livestock for use in noxious weed or fuel reduction projects from outside the planning area must be held in feedlots for sufficient time to allow weed seeds to exit their digestive tracts and fall off their coats.

### **4.19.8 Unavoidable Adverse Impacts**

Increased recreational use from outside the planning area could adversely affect soil and vegetation. Greater activity—particularly from motor vehicles—would increase the likelihood of weed introductions and spread. BLM has made provision to address these impacts and protect resources while permitting sufficient flexibility to meet resource program needs.

### **4.19.9 Short-Term Uses Versus Long-Term Productivity**

None.

### **4.19.10 Irreversible and Irretrievable Impacts**

None.

## 4.20 Potential Effects on Special Status Plants

### 4.20.1 Methodology and assumptions

BLM resource management goals, policies, standards, and guidelines must be understood and followed in relation to management actions which may affect special status plants. BLM has a mandate to maintain viable populations of federally and state-listed threatened, endangered, and BLM special status (particularly BLM ‘sensitive’) species. BLM reviews all project proposals before implementation to determine whether BLM special status species would be affected. Recommendations are incorporated into the project in accordance with the BLM-California Special Status Plant Policy (CA BLM Manual Supplement H-6840-1, Special Status Plant Management.) The intent is to prevent actions that would contribute to the necessity of listing a species under the Endangered Species Act.

### 4.20.2 Incomplete or Unavailable information

Currently, about one-half of the public lands administered by the AFO have not been inventoried for special status plants. Management actions pertaining to a number of resource programs pose potential threats to special status plants, although detailed information is not available. Programs of particular concern are recreation, grazing, and fire/fuels management. Additional studies are required to determine the effects of disturbance regimes related to these programs on special status plants and their habitats. Despite this, adequate information does exist concerning the occurrence and distribution of special status plants in the management area, their habitat requirements, physiology, and consequences of management actions.

### 4.20.3 Analysis

For the purpose of this analysis, levels of effects on special status plants are defined as follows:

**Negligible:** Effects on special status plants would be at or below detectable levels. Effects would generally be temporary or short-term (i.e., lasting less than a single year or growing season.)

**Minor:** Effects on special status plants would be detectable, but localized and of little consequence to the population. Effects would generally be temporary or short-term--but in some cases long-term. Mitigation measures, if required to offset adverse effects, would be simple and certainly successful.

**Moderate:** Effects on special status plants would be readily detectable but localized with consequences limited to local populations. Effects might be short or long-term. Mitigation measures, if required to offset adverse effects, would be extensive and would probably be successful.

**Major:** Effect on special status plants would be obvious and result in substantial consequences to species populations throughout the management area or region. Effects might be short-term, but would most likely be long-term. Extensive mitigation measures would be required to offset adverse effects, and their success would not be guaranteed.

**Short-term:** An effect that would last less than a single year.

**Long-term:** An effect that would last beyond a single year; depending on species and habitat, the change may not be reversible.

#### 4.20.4 Impacts Common to All Special Status Plants

BLM would review all project proposals before implementation to determine whether they would affect special status plants. BLM would incorporate specific recommendations concerning special status plants in project proposals where required to avoid adverse impacts on these species. Under these guidelines, the following resources management programs are not expected to substantially affect special status plants: cultural resources, soils, terrestrial and aquatic wildlife, water resources, and special management areas. With mitigation procedures and the implementation of BMPs, no substantial effects are expected from the following programs: forestry; energy and minerals; wild horses and burros; and utilities, transportation, and telecommunications. There could be indirect adverse impacts from these resources due to unknown physiological and physical responses of special status plants to disturbance regimes associated with these resources.

Management of special status plants is oriented toward creating habitat conditions that meet the requirements of individual species. BLM would develop conservation agreements or species management guidelines where needed to monitor and protect special status plants. Consistent with BLM policy, the AFO will ensure that management actions do not contribute to the decline of a special status species. The Preferred Alternative would maintain and encourage viable populations of threatened, endangered, and BLM sensitive species on lands administered by the field office.

Management of special status plants to ensure they do not decline in abundance or distribution is considered a beneficial effect of vegetation management actions. Monitoring of special status plants would provide indirect benefits. Knowledge would be gained on the status, distribution, and ecology of special status plants that would be useful in future management decisions.

Competition or habitat change resulting from the spread of invasive plants, noxious weeds, or other undesirable vegetation is recognized as a special threat to the following species: *Astragalus anxius*, *Ivesia paniculata*, and *Eriogonum prociduum*. Medusahead has invaded the Ash Valley ACEC/RNA, habitat for the above species.

Little information exists on the effects (adverse or beneficial) of fire on special status plants. However, the AFO has investigated the effects of fire on one special interest plant, Baker's globe-mallow (*Iliamna bakeri*.) This species occurs in sagebrush, juniper, and mountain mahogany-dominated communities and responds positively to fire by increased regeneration. Many special status plants are endemic to soils growing in sparsely vegetated habitats. Prescribed fire would not be likely to carry in these habitats unless they had been invaded by cheatgrass or other annual weedy vegetation, or if a prescribed fire were to spread beyond its (intended) dense woodland target. For this reason, prescribed fire would not have a major adverse impact on soil endemics; and would in fact, have long-term beneficial effects by destroying fuels and preventing larger fires in adjacent woodlands that could spread through habitats of sensitive species. On the other hand, construction of firelines and off-road travel by fire personnel could have significant impact on soil endemics. The AFO botanist would coordinate all prescribed fire activities within or adjacent to habitats of special status plants.

Fire suppression activities may have a variety of impacts on special status plants. Impacts would occur at staging areas, from fireline and safety zone construction, from widening of roads to accommodate fire-suppression vehicles, and from use of retardants. Every effort is made to dispatch resource advisers to wildland fires, especially in areas known to support critical and unique resources and to fires within the CDF direct protection area. Use of heavy equipment in the Ash Valley ACEC/RNA and in WSAs is prohibited—except with line officer approval.

Use of retardant and heavy equipment is a part of the wildland fire situation analysis, which would consider all resources at risk. The training of resource advisors in coordination with CDF on an annual basis, and readily available maps showing the distribution of special status plants, would minimize adverse impacts.

Research is needed to determine whether prescribed burns or juniper management projects, under site-specific resource and ecological guidelines, would enhance habitats for special status plants. Results of this research would be used to guide future management of these habitats and their associated special status plants. Because *detailed* information is lacking regarding the effects of fire on special status plants, this section provides a *general* analysis of the effects of fire and fuel management activities. Fire suppression can also adversely affect special status plants. See Chapter 4 “Vegetation” and Chapter 4 “Noxious Weeds” for a discussion of the potential effects of fire suppression. The AFO has initiated a fire effects study on the sensitive plant, Ash Creek Ivesia (*Ivesia paniculata*). A prescribed burn was conducted on the Ash Valley ACEC/RNA in the fall of 2004 to study the effects of pine duff removal in Ivesia habitat. Plots were read in year two (2006).

Vegetation treatments, including control of western juniper, prescribed burns, and seeding activities, may impact special status plants. Effects depend on the species, prevalence of exotic species, overall ecological condition, and the likelihood of colonization by exotics following treatment. Site examinations—to the extent feasible—would be conducted prior to treatments; however, due to the (generally) large size of treatments, species may be overlooked and adverse impacts would result if plants are uprooted or damaged during the physical process of treatment. Where canopies are opened and exotics are displaced in or near habitats of special status species, beneficial impacts may result, since sites would be improved and made suitable for re-colonization or establishment of certain special status plants.

Little information is known about the effects of grazing on special status plants. Although grazing of some of these plants by native ungulates is thought to be part of their natural ecology, large-scale introduction of livestock 150 years ago has radically changed the duration, intensity, and season-of-use with which many species may have evolved. Livestock grazing is also thought to be having substantial impacts on microbiotic crusts. However, effects on special status plants of the AFO have not been studied and are therefore unknown.

Livestock use can adversely affect the status of special status plants in several ways. Grazing removes plant material and may prevent flowering and fruiting. Trampling can damage or destroy plants. Trampling can also harm the habitats of special status plants by compacting soils or damaging stream banks. Although the effects of grazing on special status plants would mostly be adverse, grazing might benefit some plants by removing or reducing the vigor of competing plants and by preventing the growth of shrub cover in open herbaceous habitats.

Impacts from livestock use, especially grazing and trampling, have been recognized as a threat, or potential threat, to the following special status plants:

- *Astragalus agrestis* – Grazing is not known to be a threat but should be monitored.
- *Astragalus anxius* – Trampling by livestock is a potential threat but has not been observed.
- *Calochortus longebarbatus* var. *longebarbatus* – Plants and flowers are grazed by livestock; the plant is suspected to occur on BLM-administered lands.
- *Eriogonum prociduum* – Although not grazed by livestock, the plant may be threatened by trampling. Trampling was observed on this species in the Westside Grazing Allotment in 2002 and 2003. Vehicle and OHV traffic has been observed to have adverse impacts.

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- *Eriogonum umbellatum* var. *glaberrimum* – Could be threatened by grazing, but the species currently is not known to be grazed.
- *Galium glabrescens* var. *modocense* – The species may be grazed by sheep and other livestock, but grazing is not currently known to be a threat.
- *Ivesia paniculata* – This species may be affected by trampling, but this plant prefers light to moderate amounts of localized disturbance.
- *Lomatium roseanum* – This species is probably grazed by sheep and cattle, but grazing is not known to be a threat. Grazing of associated annual grasses may have a beneficial impact.
- *Lupinus uncialis* – This species may be affected by livestock trampling.
- *Mimulus evanescens* – Trampling by livestock is a threat to this species.
- *Orcuttia tenuis* – This plant is potentially affected by livestock trampling; however, the “Green Place” vernal pool is excluded from livestock grazing.
- *Phacelia inundata* – This plant is threatened by livestock trampling at Eagle Lake. The plant is thought to occur in the AFO management area.
- *Pogogyne floribunda* – This plant may be affected by livestock trampling and early-season grazing.
- *Polygonum polygaloides* var. *esotericum* – This species is threatened by livestock trampling.
- *Potentilla basaltica* – Adverse impacts from grazing were observed in 2003; these impacts would be minimized if grazing occurs in the fall.
- *Rorippa columbiae* – This species is threatened by livestock trampling.
- *Stenotus lanuginosus* – This species may be affected by the presence of livestock.

Feral horses from the Red Rock HMA have been reported on the Big Tablelands of Siskiyou County—which is outside their HMA. The Big Tablelands support BLM special interest plants. Although protection of special interest plants (California Native Plant Society List 2 and 4) is not mandatory by law or regulation, an important objective of management is proactive action to prevent the necessity of future ‘listing’ of these plants as special status species. Extirpation or over-grazing of Newberry’s cinquefoil or moss phlox by feral horses could have long-term adverse impacts on these species and may require their reclassification as BLM-sensitive species.

Energy and mineral development under all alternatives would result in impacts to special status and special interest plants. Increased mineral development would have multiple short-term and long-term effects, as well as direct and indirect adverse impacts on special status plants. Impacts include designation of most special status plant habitats as ‘Open’ to mineral development. This designation would likely lead to proliferation of roads, a reduction in habitat through construction of mineral development infrastructure, and increased habitat fragmentation. Proliferation of roads would also make access to remote areas easier for OHVs and may increase illegal collection of rare plants. Long-term adverse impacts would primarily result from loss of habitat and direct destruction of individual plants and populations.

The extent of impacts would generally be determined by the amount of activity. Other impacts that may occur are genetic isolation of individual populations and a resultant loss of biodiversity. Isolation may also lead to adverse effects on seed dispersal and on pollinators. However, studies are limited in this regard and few conclusions can be drawn.

Although several special status plants are thought to be affected by OHV use in the management area, recreation in general is not expected to substantially affect special status plants. On the Westside Grazing Allotment, adverse impacts to *Eriogonum prociduum*, *Lupinus uncialis*, and *Dimeresia howellii* (the last, a special interest plant) have resulted from OHV use. Because of NEPA review, project inventory and evaluation, avoidance and mitigation measures prescribed under a biological evaluation (an action taken for all project proposals), recreation management actions do not differ significantly in their effects on special status plants. For this reason the effects of recreation – with the exception OHV use – are not discussed further.

As described under “Potential Effects on Noxious Weeds,” the construction and maintenance of utility, transportation, and telecommunications corridors are known to be the primary means of noxious weed introduction and proliferation in the AFO management area. Although implementation of the AFO Noxious Weed Prevention Schedule would reduce the introduction and spread of noxious weeds, it would not be totally effective. Non-native invasive plants are known to out-compete and replace native plants (including special status plants) following introduction. For this reason, activities related to building and maintaining utilities, transportation, and telecommunication corridors are considered adverse.

### 4.20.5 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible adverse effects and moderate benefits to special status plants due to increased inventories, long-term studies, restoration, and enhancement projects. BLM would restore degraded habitats of special status plants and apply stipulations to reduce adverse impacts during vegetation restoration efforts. This action would have negligible benefits for special status plants.

The Preferred Alternative would aim to provide habitat conditions fulfilling individual species requirements. Protection of existing habitats and populations would have equal weight with habitat restoration or enhancement. Conservation agreements would be formulated to protect special status plants and their habitats. Conservation strategies would then be developed to ensure the health and survival of these species. Systematic inventories of the distribution and population of special status plant species would be conducted.

Vegetation management under the Preferred Alternative would benefit special status plants through increased research, protection, and management. Management under the Preferred Alternative would provide greater protection and increase long-term benefits for special status plants through the following actions:

- Develop and conduct habitat management plans, genetic studies, and biological evaluations.
- Prevent the disposal of parcels <160 acres in size, if it would result in eliminating species or listing them under the (federal) Endangered Species Act.
- For all resource management actions, permit no more than 20% elimination of a species--but only if it occurs on more than 5 acres with more than 500 individual plants. A biological evaluation would be required for areas which are smaller in size or have fewer plants. Generally, no actions would be permitted which would result in plant or habitat reductions on small parcels.
- For species in decline, stop all activities that are contributing, or are suspected to contribute, to its decline and prepare a biological evaluation, if needed.
- Establish long-term monitoring studies of rare plants and habitats.
- OHVs in the Ash Valley ACEC/RNA and the Westside Grazing Allotment would be ‘Limited to Designated Routes’.

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- Conduct studies to determine the effects of firewood cutting – including juniper removal projects – in the Alturas volcanic gravel plant communities and in habitats of Modoc milk-vetch.
- Initiate scientific studies on the effects of fire on special status plants.

The Preferred Alternative recognizes the prevalence of juniper on landscapes of the AFO and includes measures to reduce encroachment or eliminate this species in habitats where it did not historically occur. The reintroduction and use of fire (i.e., appropriate management response, wildland fire use, and prescribed burns) is recognized as beneficial throughout this document.

Effects of livestock grazing are described above in “Impacts Common to All Special Status Plants”. Administrative solutions would be emphasized for rangeland projects; however, fencing would be required in some areas to protect special status plants from grazing by wild horses and livestock. Special status species management objectives would be incorporated into allotment monitoring and evaluation processes. Grazing would have similar effects and would use site-specific management to reduce adverse impacts.

To prevent continuing adverse impacts from OHV use and livestock trampling, a livestock enclosure would be required on about 20 acres of the Westside allotment. Monitoring and/or fenced enclosures (to quantify grazing effects on special status and special interest plants) would provide short-term, and possibly long-term, beneficial impacts.

Three ACECs (existing and proposed) contain special status plants and would be managed, in part, to enhance their habitats. Added protection afforded by overlap with WSAs also exists. In these three ACEC/RNAs, careful consideration would be given to deny authorization or mitigate activities that could have a adverse effect on special status plants or their habitats. These actions, combined with conservation agreements, would provide sufficient protection.

The special status plant program would benefit—both in the short and long-term—from motorized travel designations which limit OHVs to designated or existing roads and trails in all ACECs, and in one WSA, and limit OHVs to existing or designated roads and trails in the balance of the management area.

### 4.20.6 Cumulative Effects

Cumulative impacts described in the Chapter 4.18 “Vegetation” and Chapter 4.19 “Noxious Weed” sections apply equally to special status plants. The area of analysis for cumulative impacts from noxious weed management is the AFO management area. NEPA requires that environmental analyses consider cumulative effects, i.e., total effects resulting from various and sundry impacts resulting from all management actions; past, present, and (in the reasonably foreseeable) future, regardless of the government agency, corporation, or individual undertaking such actions. A large variety of management actions and environmental processes take place on private lands, lands administered by government entities (USDA Forest Service, USFWS, CDFG, CA State Parks), tribal lands, and lands owned by PG&E that surround the AFO management area and have cumulative effects on invasive plants and noxious weeds that affect the management area. In other words, soil and vegetation are affected by management actions and environmental processes that occur outside BLM’s sphere of influence which affect the management of invasive plants and noxious weeds. County agriculture departments do coordinate with BLM in regard to herbicide application for control of noxious weeds so that special status species in vulnerable areas may be protected.

The USDA Forest Service and USFWS also contact BLM for projects with joint impacts—such as fence building, road maintenance, and other actions.

Major secondary, indirect, and cumulative impacts on special status plants are habitat degradation or loss (threatening the viability of populations), outright destruction of the plants themselves, and loss of habitat connectivity (thus reducing genetic variability and health.)

Wild horses from outside the Red Rock HMA constitute a threat to special status and special interest plants, especially when they stray from their HMA onto adjacent lands. Wild horses within the Devils Garden HMA may be adversely affecting two special status plants; Modoc knotweed and profuse-flowered pogogyne. BLM coordinates management of the Devils Garden HMA with Modoc National Forest, which has primary management responsibility, but cumulative effects still occur.

The cumulative effects of “threats” to special status plants are important and considered across the entire species range when creating conservation agreements and strategies. An example would be slender Orcutt grass. There are only a few thousand plants in BLM’s “Green Place” vernal pool. However, on lands administered by Lassen National Forest, there are a relatively large number of plants (hundreds of thousands). Therefore, conservation strategies have been proposed through analysis of the ecological state of regional populations.

Land use authorizations could result in substantial surface disturbances, whereby special status plants would be indirectly impacted through habitat fragmentation and the introduction of invasive plants and weeds from disturbed areas.

Another potential threat to special status plants is the gradual warming of the atmosphere and increase in carbon dioxide levels; this could have long-term effects on sensitive plant species finely adapted to specific environmental conditions. BLM cannot change such impacts, but would consider them in reviewing all impacts on special status species.

### **4.20.7 Mitigation Measures**

All project proposals require a special status plant inventory before implementation. If a special status plant population is found in the project area, measures will be taken to protect that population.

### **4.20.8 Unavoidable Adverse Impacts**

No unavoidable adverse effects will come to known or suspected populations of special status plants on lands administered by the AFO. This is a regulated program under which BLM must function according to federal and state law and BLM policy. Certain mitigation measures would reduce impacts on some special status plants but would also result in adverse impacts to prostrate buckwheat and lilliput lupine (soil endemics peculiar to Alturas volcanic gravel and diatomaceous earth) as well as to a number of special interest plants.

Depending on the degree of restriction applied to riparian zones, unavoidable adverse impacts could also occur to the Bogg’s Lake hedge-hyssop, ephemeral monkey flower, profuse-flowered pogogyne, Modoc knotweed, and soldier meadows cinquefoil. Failure to rest lands burned by wild or prescribed fires for two full growing seasons would have unavoidable adverse impacts on Baker’s globemallow.

### **4.20.9 Short-Term Uses Versus Long-Term Productivity**

Construction of roads, leaching fields, and facilities associated with mineral development would permit a short-term use that would eventually result in long-term losses and fragmentation of habitats for special status plants.



These activities would also increase the spread and proliferation of noxious weeds that compete for water and space with special status plants. OHV traffic would cause long-term loss to special status plants through habitat destruction, illegal plant collecting, and (indirectly) through the spread of noxious weeds.

#### **4.20.10 Irreversible and Irretrievable Impacts**

There will be no irreversible or irretrievable impacts to known or suspected populations of special status plants on lands administered by the AFO. This is a regulated program under which BLM must function according to federal and state law and BLM policy.

## 4.21 Potential Effects on Visual Resources

This section describes the potential impacts on the visual resources program as a result of implementing proposed management actions under the Preferred Alternative. Proposed management activities likely to have the greatest effect on visual resources in the AFO area are activities associated with roads, fire, grazing, vegetation management, mining, recreation, and utilities.

### 4.21.1 Methodology and Assumptions

The following assumptions were used to evaluate impacts to visual resources:

- Sensitive receptors for impacts on visual quality are visitors to BLM-administered lands or residents living next to BLM-administered lands. Visitors and residents generally would have equal or higher expectations for scenic quality than at present.
- Activities that cause the most contrast and are the most noticeable to the viewer were generally considered to have the greatest effect on scenic quality.
- Surface-disturbing activities may affect scenic quality in the AFO area. These activities include vegetation clearing, prescribed burns, chemical treatments, road and trail maintenance or construction, parking lot construction, and utility line ROW development or upgrades. These activities can affect visual resources by changing vegetative patterns; changing species composition; changing landform shape, texture, or color; or introducing non-natural features that provide contrast with the surrounding landscape character.
- The severity of an adverse visual effect depends on a variety of factors, including the size of a management action, the location and design of roads and trails, the treatment of residue or slash from vegetative harvest or mechanical treatments, and the overall visibility of the disturbed areas.
- In some cases, vegetative clearing can improve visual quality by opening pleasing views or by softening or blending contrasting vegetative boundaries caused by development or past management practices, particularly on steep slopes or prominent landforms.
- All actions proposed during the RMP process that would result in surface disturbances must be consistent with established VRM guidelines and reflect the value of visual resources.

It was assumed that management activities would meet VRM classes and that opportunities exist to meet ecosystem management goals while focusing on retaining the natural landscape.

### 4.21.2 Incomplete or Unavailable Information

Adequate information is available to analyze the effects on visual resources at the plan level.

### 4.21.3 Analysis

For the purpose of this analysis, levels of effects on visual resources are defined as follows:

**Negligible:** The impact to scenic quality would be barely detectable, affecting the experience of few visitors in the applicable setting.

**Minor:** The impact to scenic quality would be detectable, affecting the experience of many visitors in the applicable setting.

**Moderate:** The impact to scenic quality would be readily apparent, affecting the experience of the majority of visitors in the applicable setting.

**Major:** The impact to scenic quality would be severely adverse or exceptionally beneficial, affecting the experience of nearly all visitors in the applicable setting.

### 4.21.4 General Impacts

Management actions such as inventory, evaluation, and categorization of sites are not anticipated to affect visual resources. Any ground-disturbing activities, such as excavations for artifact recovery, would be site-specific and cause isolated impacts that would not be significant. Restricting, reducing, or eliminating ground-disturbing activities—such as OHV travel, fire suppression, minerals development, and recreational staging areas—would benefit visual resources by maintaining the existing natural setting at cultural resource sites.

Management actions including prescribed burns, mechanical treatments, and WFU may result in short-term visual impacts because of burned vegetation and other land disturbance on 16,998 acres. Adverse impacts would also occur from cross-country use of heavy equipment to construct fire lines or for mechanical vegetation treatments. Impacts generally would be site-specific and temporary, and mitigation measures used to meet VRM class objectives would minimize impacts and help retain the natural landscape. In addition, WFU is expected to lead to a long-term increase in the health of native plant communities, which would help retain the naturalness of the landscape and would result in beneficial visual effects.

Soils management includes standard management practices for road construction, prescribed burning, mechanical vegetation treatment, soil treatment, and seeding. Road construction would be minimized. In addition, ground-disturbing activities such as prescribed burns, mechanical vegetation treatment, soil treatment, and seeding would be minimal and would be implemented on an as-needed basis for 10,154 acres known to not be meeting land health standards. These activities would benefit the visual and scenic quality of the lands over the long term by enhancing the ecological health and natural character of the landscape.

Management to protect and restore riparian/wetland areas, sagebrush vegetation communities, and wildlife habitats and populations would indirectly benefit visual resources by maintaining and enhancing the natural character of the landscape.

Restoring unhealthy vegetation communities and reducing infestations of noxious weeds would benefit visual resources by restoring the natural diversity of the native landscape. ‘Short-term’ adverse effects would result from these actions due to the use of machinery and the disturbance associated with vegetation manipulation, but these effects are not considered significant. Potential road construction for juniper management would cause adverse visual impacts, but they would be localized and not significant, as the disturbed area would be restored with native species in order to reduce future juniper encroachment.

Managing WSAs under VRM Class I and developing buffer zones for historic trails would protect the visual integrity of the natural landscape and would result in a beneficial effect on visual resources. About 43% of the lands designated as Class I and II. The effects on visual resources would be minor as the visual landscape would be protected through planning to meet class objectives.

Management actions to close and rehabilitate roads would improve the visual character of certain locations by removing road scars and promoting growth of natural vegetation. These enhancements generally would be limited in area and would not affect overall scenic quality. Management practices to improve water quality and riparian function, including erosion control measures, instream structures, vegetation planting, and use of exclosures, are not anticipated to adversely affect visual resources because the activities would be limited in the area of impact and, for some of the measures, the visual disturbance would be temporary or would result in long-term benefits to visual resources as the natural landscape is restored. Management of the water resources program would not result in substantial effects on visual resources.

Management of wild horses is not anticipated to affect directly the visual and scenic quality of the field office area because management does not include ground-disturbing activities and would not cause visual intrusion in the landscape. Use of sensitive areas by wild horses would result in secondary effects, such as trampling, compaction, grazing of vegetation, and channel incision, that would degrade the visual quality of the landscape.

In particular, wild horses affect the visual setting at watering areas, where severe vegetation and soil damage can occur. These impacts would be site specific, generally would be limited in area, and are not considered significant.

Management activities related to minerals development, oil and gas exploration, and renewable (wind) energy development have the potential to change the natural character of the visual setting because of ground-disturbing activities and facility development. However, the potential for large-scale development is generally low in the field office area, and implementation of measures to meet VRM class objectives would minimize potential impacts. Mitigation measures would be applied to avoid potential visual intrusions from ground-disturbing activities to meet VRM class objectives.

Maintaining acquisition and retention zones would serve to protect the visual integrity of the landscape by retaining ownership of about 96% of BLM-administered lands in the field office area and managing multiple uses to meet VRM objectives. Disposal actions would lead to development that does not meet VRM objectives. Because the parcels suitable for disposal are generally small and isolated, no impacts on visual resources are anticipated from disposal actions. Effects on visual resources from the lands and realty program are not considered significant.

All proposed management activities to preserve the wilderness character of WSAs and maintaining a 'Primitive' ROS setting for WSR segments are designed to maintain the natural setting and to reduce visual intrusions. No impacts on visual resources are anticipated from such actions. Establishing scenic quality buffer zones for vista points, trails, bike routes, campgrounds, and roads would retain the visual setting and reduce potential future impacts on the natural landscape. The designation of the Infernal Caverns/Rocky Prairie and Pit River SRMAs and restricting OHV use to 'Limited to Designated or Existing Routes' would result in beneficial effects on visual resources by helping to retain the natural character of the high-use areas.

OHV use would be 'Limited to Existing or Designated Routes', except for the 80-acre Cinder Cone OHV management area, which would be designated as 'Open'. This approach would limit potential visual impacts from cross-country use such as soil exposure and erosion and loss of vegetation. The 'Open' designation would be limited to a small area that historically has been used for OHV activities; therefore, no additional impacts on visual resources are anticipated.

Management of the existing Ash Valley ACEC and Baker Cypress Natural Area, including restrictions on OHV use, would continue to retain the natural setting. Continuation of management of WSAs to meet Class I VRM objectives and to meet non-impairment criteria also would retain the existing visual settings in these sensitive areas.

New utility line or communication sites would avoid locations within WSAs (56,648 acres), the Ash Valley ACEC (1,322 acres), proposed ACECs, and the Lower Pit River WSR in order to preserve the natural setting in these areas from visual intrusions from facilities such as power lines and communications towers.

### **4.21.5 Analysis of the Preferred Alternative**

The Preferred Alternative would result in minor adverse and moderate to major beneficial impacts to scenic quality. Approximately 42% of the field office area would be managed as VRM Class I or II, and approximately 21% would be designated as VRM Class III (see Map VRM-1). Class I designations apply only to WSAs, and change of the WSA status would require an action by Congress. Only 37% of the field office area would be managed as VRM Class IV.

The existing character of the visual landscape will be protected under management as VRM Class I (preservation), Class II (retention of the existing landscape character), and Class III (partial retention of the existing landscape character). The lands that would be managed under VRM Class IV criteria (major modification of the existing landscape) would permit new developments that could greatly alter the existing landscape.

Management actions associated with water resources, wild horses and burros, grazing, and lands and realty would result in negligible effects on visual resources. Management actions that include ground-disturbing activities have the greatest potential to affect visual resources. The fire and fuels, soil resources, terrestrial and aquatic wildlife, vegetation, and forestry programs have the potential to result in short-term adverse effects on visual resources. Because the ground-disturbing activities associated with these resource programs primarily are involved with restoring healthier and more diverse native plant communities to the landscape, these programs would benefit visual resources over the long-term.

With respect to recreation resources, designation of special management areas and limitation of OHV use to roads and trails in most areas also would result in reduced impacts on visual resources in these areas over time. Cultural resource management would result in short-term, isolated disturbances. Utilities, transportation, and telecommunications infrastructure and energy and minerals development also would adversely affect visual resources. Site-disturbing activities would be designed to comply with the VRM designation where the facilities are sited as a means of reducing adverse effects.

The Preferred Alternative establishes a three-mile buffer along major travel routes—where all projects would be required to minimize visual impacts—and restricts projects in areas of high scenic quality. The management of these buffer areas would enhance the preservation of the natural landscape in highly visible areas and would result in a minor to moderate beneficial effect on visual resources.

Vegetation management actions under the Preferred Alternative, including the designation of six ACECs and four RNAs, would protect vegetation diversity and visual settings.

Under the Preferred Alternative 2.5 miles of Wild and Scenic River segment would be designated as Class II in the Lower Pit River Canyon WSR and 16 miles Class I in Upper Pit River Canyon and Lower Horse Creek Canyon WSRs due to WSA status.

Closures for saleable and locatable minerals, and renewable energy, coupled with NSO stipulations for leasable minerals in ACECs, WSAs, and WSR corridors, would have minor to moderate beneficial effects on visual resources. Surface use and occupancy requirements on 200,000 acres would protect visual resources from adverse effects associated with leasable minerals. Area-wide management of locatable minerals would have minor to moderate adverse effects, but would be limited to site-specific locations. Management and special stipulations would result in beneficial effects on visual resources by protecting the natural landscape character from disturbance. Because most mineral potential is reasonably low in the field office area, potential impacts of large-scale minerals development are not expected to be significant.

Forestry management actions under the Preferred Alternative would promote management for characteristics of late-seral stages would result in more large trees on the landscape, which are visually preferable to visitors.

Under the Preferred Alternative, about 24% of the field office area would be designated with 'Primitive' and SPNM ROS settings. This approach would retain the natural setting in key areas.

The Preferred Alternative would designate six ACECs, covering approximately 29,171 acres. Utility lines would be excluded from Lower Pit River WSR, WSAs, and ACECs. ROW holders would be responsible for removing abandoned facilities from public land. New corridors would have moderate adverse effects. OHV use would be 'Closed' where OHV use is not in conformance with Resource Advisory Council guidelines, and OHVs would be 'Limited to Existing or Designated Routes' in most of the management area. These additional activities would enhance visual quality.

### 4.21.6 Summary of Effects of the Preferred Alternative

The Preferred Alternative would result in minor adverse and moderate to major beneficial impacts to scenic quality. 42% of the field office area would be managed as VRM Class I and II. 21% would be managed as Class III and 37% would be managed as Class IV. Recreation management identifies about one-fourth of the field office area for non-motorized recreation activities, to emphasize recreation opportunities in natural settings. OHV use would be 'Limited to Designated or Existing Routes', and the potential for visual impacts of cross-country use would be very low. A three-mile buffer on major travel routes would be established, where all projects would be required to minimize visual impacts.

Most areas of the field office, except for WSAs, ACECs, and WSR segments, would be 'Open' to minerals development; however, because the potential for large-scale development is generally low, impacts on visual resources are not expected to be significant. Utilities also would make use of existing corridors, and possible adverse impacts on undisturbed areas are expected to be reduced by the removal of abandoned facilities.

### 4.21.7 Cumulative Effects

The cumulative effects of the Preferred Alternative generally would be influenced by requiring all projects be implemented to minimize visual impacts—and restricting projects in areas of high scenic quality. The three-mile buffer along major travel routes would provide significant benefits to VRM and travelers on major travel routes.

The effects of proposed management under this alternative and activities on surrounding areas would result in a similar level of incremental beneficial effects on visual resources from reduced impacts of OHV use, concentration of utility developments into corridors, and removal of facilities in abandoned transmission corridors would improve the visual setting, especially when considered in combination of planning new projects to meet VRM objectives.

Most adverse impacts from activities associated with BLM resource programs would be temporary and would be limited to the local area where the activities occur. The cumulative effects on visual resources under the Preferred Alternative are not expected to be significant when considered in combination with other land uses and reasonably foreseeable activities in the field office area

### **4.21.8 Mitigation Measures**

Mitigation measures are not needed.

### **4.21.9 Unavoidable Adverse Impacts**

None.

### **4.21.10 Short-Term Uses Versus Long-Term Productivity**

Prescribed fire and mechanical treatments would have short term adverse impacts to visual resources from vegetation treatments, but over time with vegetation reestablishment and change, beneficial effects would occur. In the long term, the three-mile buffer along major travel routes would provide significant benefits to VRM and travelers on major travel routes where all projects would be required to minimize visual impacts—and restricting projects in areas of high scenic quality.

### **4.21.11 Irreversible and Irretrievable Impacts**

If prescribed fire and mechanical treatments are conducted, the targeted vegetation would be lost and irretrievable, but generally the same type of vegetation would reestablish itself with different seral stages over time.

## 4.22 Potential Effects on Water Resources

This section describes the potential impacts on water resources as a result of implementing proposed management actions under the Preferred Alternative.

### 4.22.1 Methodology and Assumptions

We evaluated the potential for proposed management activities to affect water resources, mainly through the framework of the S&Gs. We used the following standards in the analysis: Standard 2 (Streams) and Standard 3 (Water Quality).<sup>1</sup> In addition, the analysis considered water quantity (for both surface water and groundwater) and flooding, as directed by Executive Order 11988 (Floodplain Management). We have briefly discussed each criterion. For a more complete discussion of standards, please see the source document.

This analysis considered an effect on water *adverse* if it would do the following:

- **Standard 2 – Streams:** prevent or impair significant progress toward stream channel form and function that is characteristic of the soil type, climate, and landform.
- **Standard 3 – Water Quality:** prevent or impair significant progress toward water that has characteristics suitable for existing or potential beneficial uses. To support beneficial uses, surface water and groundwater should comply with the objectives of the Clean Water Act and other applicable water quality requirements, including meeting the California and Nevada state standards.
- **Water Quantity:** alter surface flows or aquifer volume so as to impair existing or future consumptive or instream uses.
- **Flooding:** result in incompatible floodplain development, not conform to the standards and criteria of the National Flood Insurance Program, or impair natural and beneficial floodplain values.

The following key water resources concepts are fundamental to understanding the discussion of environmental consequences.

Key factors related to stream form and functions include channel gradient, pool frequency, width to depth ratio, roughness, sinuosity, and sediment transport. All of these factors should be able to function naturally and be characteristic of the soil type, climate, and landform. Key indicators include the following:

- Gravel bars and other coarse-textured stream deposits are successfully colonized and stabilized by woody riparian species.
- Streambank vegetation is vigorous and diverse, mostly perennial, and holds and protects banks during high streamflow events.
- The stream water surface has a high degree of shading, resulting in cooler water in summer and reduced icing in winter.
- Portions of the primary floodplain are frequently flooded (inundated every 1 to 5 years).

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<sup>1</sup> Standard 1, Upland Soils, and Standard 4, Riparian and Wetland Sites, while relating to water resources, are not discussed in this section. They are discussed in the “Soil Resources” and “Vegetation” sections of this chapter, respectively.



Water quality in a typical surface water body is influenced by processes and activities that take place in upstream areas of the drainage basin or watershed. In a natural system, surface water quality depends mainly on the mineral composition of the rocks in the upper source areas of the stream, as well as the types of rock and sediments that groundwater passes through on its way to the stream. Farther downstream, the water quality becomes more influenced by land use and land management activities, including discharges from both point and nonpoint sources. The analysis considered the following key constituents: sediment, temperature, nutrients, pathogens, and dissolved oxygen. The analysis did not consider other constituents, such as pH and conductivity, because of their low potential to be affected by the proposed management actions.

Sediment is generated when soils are disturbed and discharged directly to a water body or carried to the receiving water in overland runoff. High concentrations of suspended sediment in surface waters cause many adverse consequences, including the following:

- increased turbidity or impaired water clarity,
- reduced light penetration,
- reduced ability of predators that rely on sight to capture prey,
- clogged gills of fish and aquatic invertebrates,
- reduced spawning,
- reduced survival of juvenile fish, and
- reduced angling success.

Other impacts, such as smothering the benthic community and changes in the composition of the bed substrate, result when sediment is deposited in slow-moving receiving waters. Suspended sediment is also an efficient carrier of toxic organic substances and trace metals because these substances can bind to sediment particles. Once sediment falls out of suspension, pollutants in enriched bottom sediments can be remobilized under suitable environmental conditions and pose a risk to benthic life.

Note that in areas starved of sediment (e.g., areas downstream of reservoirs or other artificial impoundments) increases in sediment can benefit channel geomorphology and development of aquatic habitat.

Elevated water temperatures can substantially affect organisms adapted to a cold water environment. A rise in water temperature of only a few degrees over ambient conditions can reduce the number of or eliminate sensitive invertebrates and fish. In general, sustained summer water temperatures exceeding 20°C (68°F) are considered to be stressful—and perhaps lethal—to many cold water organisms in the AFO area. Large daily fluctuations in temperature can also result in adverse effects.

Nutrients are needed for photosynthesis for supporting the requirements of organisms at higher trophic levels. In freshwater aquatic systems, the main nutrients are phosphorus and nitrogen. In particular, phosphorus is a controlling factor on photosynthesis in aquatic systems. High concentrations can stimulate the growth of plants and algae. Excessive growth of plants and algae can do the following:

- reduce the aesthetic appeal of the water for recreational users,
- clog the habitat used by other aquatic organisms,
- cause large daily swings in DO concentrations, and
- cause other nuisance conditions.

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Excessive levels of phosphorus and nitrogen that lead to undesirable algal blooms are part of a process known as eutrophication.

Waterborne pathogens could result in various adverse effects on warm-blooded animals drinking the water and even some possible adverse effects on human contact recreation activities. The main indicator of pathogens is the presence of coliform bacteria, which are microorganisms that live in the intestines of both warm- and cold-blooded animals, including humans. These bacteria enter the hydrologic system through fecal material that enters into water bodies. The presence of fecal coliform bacteria in water shows that fecal material has entered the water body. The presence of fecal coliform can also show that other harmful bacteria or viruses might be present. Some of the results of these bacteria or viruses in the water body could be exposure of people using the water to typhoid fever, bacterial gastroenteritis, and hepatitis A. Fecal coliform bacteria in water bodies on BLM-administered lands are usually a result of nonpoint sources of human and animal waste.

The amount of oxygen that can be dissolved in water differs with temperature. Cold water can contain more DO than warm water. The amount of DO present in relation to the amount that could be dissolved at a given temperature is referred to as the saturation level, which is expressed as a percentage. Decomposition of organic matter by microorganisms depletes levels of DO in slow-moving receiving waters and lakes and reservoirs. The degree of potential DO depletion is measured by the biochemical oxygen demand test, which measures the amount of oxidizable matter. Factors resulting in increased DO levels include the following:

- physical mixing and agitation of the water (aeration),
- photosynthetic production of oxygen by aquatic algae and plants, and
- lower water temperatures.

When DO levels drop too low, waters can become uninhabitable for aquatic organisms and might result in fish kills.

Water quantity is related to the volume of flow and/or storage in a given water body. For groundwater, water quantity is expressed as aquifer volume. Groundwater resources should be sufficient to support beneficial uses, which can include domestic and agricultural supply. Surface water flows might also support the following:

- domestic and agricultural consumptive uses,
- recreational activity,
- biological resources (such as fish passage), and
- water quality.

The Federal Emergency Management Agency (FEMA) provides information on flood hazard and frequency on its Flood Insurance Rate Maps. FEMA delineates zones to show flood hazard potential. In general, flooding occurs along waterways, with infrequent localized flooding also occurring because of constrictions of drainage systems or surface water ponding. Flooding generally benefits the natural ecosystem, but it can imperil humans, livestock, wild horses and burros, and property.

Floodwaters can also mobilize and direct contaminants into previously uncontaminated waters. Human activity, such as increases in soil compaction or impervious surfaces such as pavement, can reduce the ability for precipitation to infiltrate into soil and increase the speed of conveyance—altering the timing and increasing the peak runoff during precipitation events.

Assessments and data used to compare water quality condition with the indicators above are maintained in several databases and linked to GIS layers. Water quality data are maintained in the Excel Water Quality database in the AFO. California Irrigation Management Information System data were used to help normalize water temperature data.

Each state maintains a database of water rights assertions and actions. In addition, BLM's field offices maintain a Water Source Inventory database, which is partially complete.

### 4.22.2 Analysis Methodology

The analysis boundary for considering the effects on water resources is all the lands within the AFO's jurisdiction. For considering cumulative impacts, we considered all lands within the watersheds of AFO holdings, as well as any downstream conditions to which project alternatives could contribute.

In analyzing effects on water resources, we made the following assumptions.

- Short-term effects are those expected to occur within 1 to 5 years of an activity's implementation. Long-term effects are those that would occur after the first 5 years of implementation but within the life of the RMP (projected to be 20 years).
- Adverse effects on water resources throughout the AFO area would be minimized through the use of standard management practices and adherence to Standards 2 (streams) and 3 (Water Quality) of the S&Gs (Appendix B), as well as BLM's source water and groundwater exportation policies.
- Because of the programmatic nature of the project alternatives, we have discussed the impacts qualitatively. In some cases, more specific analysis would be required to precisely determine the extent of potential impacts. We would conduct such analysis when a management action is clearly defined.
- Air quality management actions relate mainly to use of fire. For this reason, we have discussed potential effects with the effects from fire and fuels management actions.

The management actions that could lead to the effects described above include the following on-the-ground activities:

- *Ground disturbance* can result from many activities, including
  - archaeological investigations;
  - mechanical and hand treatments of vegetation;
  - livestock grazing
  - energy and mineral development;
  - harvesting of timber;
  - road construction;
  - recreation activities, including OHV use; and
  - installing fences and exclosures.

If not properly managed, this ground disturbance could lead to erosion and sedimentation into waterways, with such degrading of water quality as increased turbidity and smothering of habitat.

- *Streambed disturbance* can mobilize sediments and increase turbidity downstream. Construction activities in streams can also introduce the potential for releases of construction-related hazardous materials.

Because of the direct mechanism for exposure to such contaminants, instream work is of particular concern. Long-term effects would be related to increases or decreases in flows and sediment transport, with effects on geomorphology and stream health.

- *Reservoirs and instream structures* can affect storage and flows in surface water bodies. If a new reservoir is built, storage in that area would increase, and flows downstream could decline.
- *Livestock distribution* can increase or decrease the effect of livestock, depending on their location and density. If livestock are concentrated in small areas or along fence lines, the effect of animal waste and soil disturbance from trampling would be greater in those areas—with associated effects related to soil disturbance and compaction, as well as increased concentrations of nutrients and pathogens. Concentration of livestock in riparian areas can destroy streambanks and remove riparian vegetation. Such concentration can occur where alternative water supplies are not available or where exclosures are not used. Similar effects can result from the activities of wild horses and burros.
- *Altered drainage patterns* could result from ground-disturbing activities, such as road building, timber harvesting, and installing instream structures. Altered drainage patterns could increase erosion and sedimentation or violate water quality standards by directing contaminants into previously uncontaminated waters.
- *Roads and vehicles* can produce a variety of contaminants that can wash into water bodies during precipitation events. Such contaminants include oil and grease, gasoline, heavy metals, and sediment. Improperly maintained ditches and culverts for roads can concentrate runoff from roads and cause erosion. Off-road vehicles can also cause erosion.
- *Herbicides*, if improperly applied, can cause violations of water quality standards. Residual traces of herbicides can be washed into soils and water bodies during precipitation events.
- *Water transfers* can result in water being removed from a system and in net decreases in water quantity, or they can otherwise degrade beneficial uses.
- *Public visitation* could mean an increase in ground-disturbing activities from foot and vehicle traffic. Water quality standards could also be violated if an increase in vehicle traffic leads to an increase in contaminants washing off roads into the water bodies. Water bodies could be directly polluted by littering, indiscriminant discharges from recreational vehicles, or direct influx of body waste to a lake or stream.
- *Increased use of trails* could lead to increased erosion and sedimentation.
- *Improper locating of projects* could result in adverse effects to many of the factors listed above.

### 4.22.3 Incomplete or Unavailable Information

The water quality database contains all water quality data collected since 1979. Although the data were collected and analyzed using protocols approved or accepted by the U.S. Environmental Protection Agency (EPA) and U.S. Geological Survey (USGS), the quality of the work varies considerably with the experience of the field and analytical people. Because of funding constraints, there has been no regular monitoring program, and consistency differs from year to year.

Beginning in hydrologic year 2002, the AFO began a conscientious effort to collect at least a baseline minimum of water quality information on all perennial and important intermittent streams. This effort resulted in the collection of indicator variables generally sufficient to suggest where water quality conditions probably are and are not meeting the water quality indicators listed above. This information would also be used to direct BLM's future water quality data collection to data gaps. Because of time constraints, the data used in this report have not been validated and probably reflect a worst-case scenario.

Other areas where data gaps could be filled include the following:

- More water quality data is needed to determine the condition of other waters, including springs, intermittent streams, lakes, and ponds.
- On the basis of existing data, follow-up data collection is needed on waters that might not meet standards or the needs of desired beneficial uses, mainly the desired assemblage of aquatic species.

### 4.22.4 Analysis

This analysis defined the levels of effects on water resources management as follows:

**Negligible:** Any chemical, physical, or biological effects would not be detectable, would be well below water quality standards or criteria, and would be within historical or desired water quality conditions.

**Minor:** Chemical, physical, or biological effects would be detectable but would be well below water quality standards or criteria and within historical or desired water quality conditions.

**Moderate:** Chemical, physical, or biological effects would be detectable but would be at or below water quality standards or criteria. Historical baseline or desired water quality conditions would be altered on a short-term basis.

**Major:** Chemical, physical, or biological effects would be detectable and would be frequently altered from the historical baseline or desired water quality conditions and/or chemical, physical, or biological water quality standards or criteria would be exceeded on a short-term basis.

### 4.22.5 Impacts

Major water-disturbing activities that are expected to occur include the following:

- Livestock grazing,
- recreation and OHV use,
- fire use and fuels treatments,
- road construction and maintenance, and
- juniper treatment and timber harvest.

As a result of these activities, impacts include:

- hydrologic modifications through soil erosion and soil compaction, and
- decreased infiltration and increased runoff, thereby degrading water quality and quantity through increased sedimentation and streambank alteration.

Forestry and juniper management include harvest, fuels management, and reforestation. The ground-disturbing aspects of these activities in the short term can decrease infiltration and increase runoff, erosion, turbidity, soil compaction, and sedimentation (Riekerk 1989). Timber and juniper operations would have to implement measures as needed to protect water quality. Where forestry and juniper actions improve ecosystem condition, long-term benefits would accrue to water quality, stream channel condition, and flooding as a result of improved natural functioning of forested areas and reductions in catastrophic fires through fuels management.

If not properly managed, fires can increase erosion and sedimentation and result in other declines in water quality, such as the following:

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- increases in organic carbon,
- releases of other contaminants from burned material, and
- decreased infiltration that results in increases in peak runoff and flooding.

Fire can therefore degrade stream channel condition, lower water quality; intensify flooding, and lower water quantity. These effects are particularly acute during and following catastrophic fires. In general, use of AMR, WFU, and fire and fuels management actions would benefit water in the long term by reducing the potential for catastrophic fires.

Rehabilitation activities would also result in both short- and long-term benefits. Short-term adverse effects could result from certain fuels management activities, including chemical and mechanical treatments. As discussed above, management measures would be implemented to reduce or avoid these effects, and the long-term benefits of such activities would generally offset these effects.

Livestock grazing and wild horse uses introduce the potential for ongoing soil compaction, erosion, sedimentation, and degrading of stream channel condition where exclosures are not established (Fleischner 1994). The presence of livestock and wild horses could also degrade water quality when animal wastes are washed into water bodies, increasing nutrient (Belsky, et al 1999) and pathogen levels (Bohn and Buckhouse 1985b). Where allotments are failing to meet land health standards, appropriate guidelines would be implemented as stated in the S&Gs. Developing water sources is expected to generally protect water quality by reducing direct use of springs by livestock and would also benefit water supply and stream channel condition. All of these activities would result in long-term benefits, particularly where the activities are focused in areas not meeting land health standards. Overall, livestock and wild horse use would result in short- and long-term minor to moderate adverse impacts on hydrology and water quality.

Recreation, in general, can lead to surface disturbance; release of human-related contaminants such as nutrients, bacteria, and trash; and other effects from vehicle use. Water-based recreation represents a direct mechanism for contaminating water bodies. Where recreation is properly managed (e.g., restricted to suitable locations and activities), substantial adverse effects on water resources and water quality in particular could be minimized or avoided; specific actions with potential adverse effects include new trail and facility construction, with short-term effects from construction and longer-term effects from the use of these areas.

BLM would implement measures to reduce short-term effects so that they would not be significant. In addition, as discussed above, proper siting and management would reduce long-term adverse effects.

Managing the existing Ash Valley ACEC and Baker Cypress Natural Area, including restrictions on OHV use, would continue, with resulting benefits to water resources. Managing WSAs to retain their wilderness character is generally expected to minimize erosion, soil compaction, and sedimentation—thereby improving water quality and hydrologic function.

Granting ROWs would not degrade water quality, but building facilities on ROWs could cause adverse effects as ground disturbance. Such construction could do the following:

- decrease infiltration;
- increase soil compaction, erosion, sedimentation, and runoff; and
- release of construction-related hazardous materials.

Before allowing any major construction, BLM would perform project-specific environmental analysis to determine potential water quality effects and suitable mitigation.

Weed control by herbicides or mechanical means would cause negligible to minor short-term disturbance to soil chemistry, structure, productivity, and abundance through herbicide applications, equipment disruption and compaction, and wind erosion. Methods for herbicide application would follow label requirements, which would ensure that any effects from herbicide use would be minimal. The long-term benefits of weed control and a restored sagebrush-steppe community would include stabilized soils and improved or restored natural fertility, productivity, and function. Such benefits would be long term and moderate in intensity and would indirectly benefit water resources.

Many of the actions under the resource programs propose measures that would protect water resources, such as use of exclosures and closing areas to certain uses. Of these measures, management actions for soil and water resources are most explicitly aimed at maintaining and improving progress toward PFC and would most benefit water resources. Exclosures and closures of areas for wildlife and archeological concerns would offer extended benefits to water resources as a byproduct. Other types of management actions are as follows:

- limiting or prohibiting activities near intermittent and perennial streams in areas not meeting land health standards or where such activities would disrupt watershed function or processes;
- managing livestock grazing patterns;
- controlling invasive species;
- preventing compaction of shrink-swell soils;
- establishing buffers around sensitive sites; and
- limiting ground-disturbing activities near water bodies and where soils are not in PFC.

These actions would also marginally reduce harmful flooding and improve water supplies by encouraging soil water retention and later release over the season. Measures to improve fish and wildlife habitat and to support special-status species would benefit water quality over the long term. The indirect benefits of habitat rehabilitation, increased water availability, managing grazing practices, use of exclosures, and OHV restrictions can improve soil stability, hydrologic function, and overall beneficial use of water supplies. Building new islands for waterfowl would likely result in short-term increases in turbidity in reservoirs and in short-term adverse effects that would be difficult to avoid. For special status species management, water resources could benefit greatly in the areas where management action is focused—for instance, where instream flows and channel condition are improved for use by certain fish species.

### 4.22.6 Analysis of the Preferred Alternative

The Preferred Alternative would result in minor adverse impacts and minor to moderate beneficial impacts to hydrologic function and water quality. Under the Preferred Alternative, the large area proposed for the full range of fire suppression options (486,047 acres) and small acreage proposed for WFU would reduce the potential for catastrophic fire over the field office area.

A total of 36 miles of greenstripping to protect at-risk native plant communities would help protect against the potential for catastrophic fire. The area of fuels treatment (10,000 acres per year for prescribed fire, 10,000 acres per year for mechanical treatment) would help promote the natural fire regime that would produce a natural vegetation component and enhanced soil structure to indirectly support natural hydrologic and water quality processes.

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Over the life of the plan, 200,000 acres (40% of the field office area) could be treated mechanically or by prescribed fire. BLM would intensively manage biological and chemical treatments on 1,250 and 2000 acres per year, respectively. Therefore, any adverse effects would be minor and short term. Combined adverse effects over the life of the plan would be major but short term. Beneficial long-term effects would outweigh any adverse effects.

Mechanical treatment of juniper on 80,000 acres, harvesting timber on 12,000 acres, and reforestation on 8,000 acres could result in major short-term adverse effects on water resources such as decreased infiltration and increased runoff, erosion, soil compaction, and sedimentation. The result would be decreases in streambank stability and water quality. BLM would design timber and juniper operations to protect water resources. In addition, over the long term, artificial regeneration and establishing of the natural sagebrush-steppe community would increase vegetation cover, with corresponding benefits to water resources over a major area.

Hand treatments (over the life of the plan) of 6,800 acres (both juniper and timber) would benefit water resources by minimizing soil disturbance and helping to restore natural hydrologic processes. Leaving felled juniper in place would contribute to erosion and sedimentation control.

Prescribed burning on 113,800 acres might moderately increase erosion and runoff on a short-term basis, but long-term benefits would outweigh any adverse effects. Fuelwood cutting on 15,000 acres might result in minor and short-term adverse effects on water resources during runoff events. The resulting long-term benefits to water resources from removing juniper would compensate for these adverse effects.

Improperly managed biological treatment (e.g., overgrazing by goats) could degrade water quality and decrease streambank stability. BLM would intensively manage biological and chemical treatments annually on 1250 and 2,000 acres, respectively. Therefore, any adverse effects would be minor and short term. Benefits to water resources, however, would be moderate in the short and long term through enhanced recovery of the natural hydrologic processes.

Expanding existing utility ROWs up to a maximum of 500 feet under Preferred Alternative would introduce the potential for degrading water resources within those corridors as they are developed. By designating corridors for transportation and utilities, BLM would define the preferred areas for placing new projects. Expanding ROWs would benefit water resources by promoting the use of certain areas for more than one project. Expanding ROWs would also reduce the opportunities for projects to be implemented in multiple areas and would thus minimize the area subject to surface disturbance and potential sedimentation of water resources.

Maintaining 28 miles of roads and building 10 miles of permanent and 50 miles of temporary roads would have minor adverse effects on water resources throughout the field office area. All adverse effects to water resources, however, would be minimized through the use of BMPs. The seasonal gating or closing of 81 miles of roads would moderately benefit water resources over the long term by restricting vehicle access to large areas during wet conditions.

Cold water and warm water fishery habitats are expected to improve in 11 reservoirs and two streams under the Preferred Alternative. This improvement would benefit water resources. Some of these actions, such as rebuilding ponds and building artificial reefs, bypass facilities, and water circulation systems, might increase turbidity in the short term. BLM would implement measures to reduce these effects. The long-term benefits to water quality and stream channel condition would compensate for any adverse effects.



OHV use would be largely ‘Limited to Existing or Designated Routes’, which would minimize adverse impacts to certain roads and to water resources where OHVs travel cross country. A total of 3,405 acres would be ‘Closed’ to OHV use for cultural, riparian and wildlife concerns. This closure would provide more water resource protection. About 119,000 acres would have ROS designations of ‘Primitive’ or SPNM. These designations would have major short- and long-term benefits to water resources by eliminating motorized vehicle use.

Developing 9 interpretive sites, 5 to 10 parking areas, and up to 25.5 miles of new trails could have minor short-term adverse effects from construction and minor long-term adverse effects from the use of these areas.

The ACEC designation for 29,171 acres would provide more protection for water resources and would result in moderate short- and long-term benefits to water quality and hydrology. In addition, the Preferred Alternative recommends approximately 19 miles of WSR segments. This designation would have corresponding benefits to water resources in those areas.

Other actions that would reduce surface disturbance and benefit water resources include the following:

- building exclosures for all spring areas not in properly functioning condition;
- building new permanent exclosures on 2,950 acres for cultural, wildlife, and riparian protection;
- building more temporary exclosures on 300 acres for aspen areas to extend protection to water resources in those areas; and
- installing 25 miles of bioengineering projects, such as felled juniper placement, along perennial, intermittent, and ephemeral streams to stabilize stream and drainage banks and trap and keep excess sediment from being carried through water courses.

Bioengineering in drainages would cover relatively small areas, but both short- and long-term benefits would result. Bioengineering projects would especially benefit streambank stability, water quality, and productivity in riparian areas. Further bioengineering, such as juniper scattering on 200 acres of upland soils, would minimize upland soil erosion and have scattered beneficial short and long-term effects on water resources. A total of 75 more water developments, mainly for wildlife enhancement and livestock use, would be built over the life of the plan. These developments would benefit water resources in the long term by reducing livestock concentration around existing water developments and riparian areas. The above actions combined would produce moderate short- and long-term benefits to water resources.

### 4.22.7 Cumulative Effects

Cumulative effects are mainly expected where water bodies do not meet land health standards (on BLM-administered lands) or are designated as impaired under the Clean Water Act, Section 303(d) (on both BLM- and non-BLM-administered lands). Water bodies meeting this definition are listed in Chapter 3. In such areas, any management action that can impede the meeting of land health standards would adversely affect water quality. Such impacts are not considered substantial. Land uses on areas surrounding BLM holdings could generate adverse effects on water resources. These effects could be exacerbated by BLM actions with similar potential adverse effects.

Known activities and conditions on non-BLM-administered lands in the AFO area include the following:

- conversion of sagebrush and other habitats to agricultural or residential use,
- invasions of noxious weeds,
- juniper treatments,

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- logging and road building,
- livestock grazing,
- water use, and
- fire.

In approving specific activities and implementing suitable measures and management practices for lands it administers, BLM is expected to consider these adjacent uses and the potential for BLM's activities to exacerbate potential cumulative adverse effects. Therefore, although some cumulatively considerable effects might result from BLM activities in combination with other land uses, such effects are expected to be minimal.

### **4.22.8 Mitigation Measures**

All resource uses with the potential to degrade water resources would employ BMPs at the activity or project level to minimize potential adverse effects. Reduction of surface-disturbing activities in and near streams, riparian areas, and wetland areas would also mitigate adverse effects. Administrative actions such as halting surface disturbing activities, changes in grazing management, and increased enforcement of travel restrictions can be taken where water resources are being degraded.

### **4.22.9 Unavoidable Adverse Impacts**

Resource uses of most concern would be livestock grazing, wild horses, new road construction, and OHV use, because of their potential for localized and widespread surface disturbance. Actions with similar but smaller adverse effects are related to forestry, issuing ROWs, and mineral extraction because these actions would disturb smaller areas. Fire and fuels management has a great potential to degrade water resources, but natural recovery of watersheds and benefits to water resources following fire and fuel uses would outweigh these effects.

### **4.22.10 Short-Term Uses Versus Long-Term Productivity**

Short-term uses resulting in adverse impacts to water resources—such as vegetation and juniper treatments and fire use—would generate enhanced long-term productivity.

### **4.22.11 Irreversible and Irretrievable Impacts**

Building water developments and structures would permanently modify existing water courses and riparian areas as long as they are left in place and continue to be used.

## **4.23 Potential Effects on Wild Horses**

This section describes the direct, indirect, and cumulative effects on wild horses as a result of implementing proposed management actions under the Preferred Alternative. Impacts from decisions concerning air quality, wildland fire management, noxious weeds and special status plants, visual resources, forestry and wild and scenic rivers would have negligible or minor impacts on wild horses; therefore, they will not be discussed further in this analysis. Impacts from decisions concerning fuels management, soils, wildlife, vegetation, water resources, recreation, and livestock grazing would potentially impact wild horses.

### **4.23.1 Methodology and Assumptions**

Gathering and relocating of horses gathered on the USDA Forest Service's Devil's Garden Wild Horse Territory, Emigrant Herd Area, as numbers reach the AML, would be in cooperation with the Modoc National Forest as defined in the 1980 Memorandum of Understanding (see Map WHB-1). Included in the Emigrant Herd Area is the BLM Strip Allotment, which includes 7,398 acres or one-sixth of the 43,345 acres making up the Emigrant Herd Area. Management actions that would increase or decrease the availability of forage such as changes in livestock numbers and/or season of use would be conducted by the Modoc National Forest. As BLM does not "manage" this herd, it will not be evaluated.

The Red Rock HMA (CA-251) is much smaller, but is managed by BLM. It is 16,895 acres (12,475 acres under BLM jurisdiction and 4,420 acres in private hands) and there are six grazing allotments within the HMA: Mahogany Mountain (#1316), Modoc Gulch (#1312), West Mahogany (#01323), No. Red Rock Lake (#01304), Big Tablelands (#01314), and Coyote Ridge (#01318). The AML is 16 to 25 horses. Based on a 2003 aerial survey, the horse population of this HMA was estimated at 30 plus individuals. As a result, 12 horses were removed, leaving an estimated present population of 18 plus animals. Control of animal numbers is the principal management action. As well, horses are removed if they stray outside the boundaries of their HMA. Animal movement and distribution are controlled by fencing and the location of water sources; however, decisions regarding these tools are generally made through AMPs aimed at livestock management.

The need to gather animals is determined when monitoring indicates that populations exceed AML criteria. Future horse gathers would be supported by NEPA analyses subsequent to this RMP. Excess horses are gathered to prevent resource overuse and to keep the herd healthy. Generally, gathering is scheduled every 3 to 5 years, depending on reproductive rates, death rates, funding, public concern, and other special management considerations. Site-specific gathering details, including trap sites, are determined at the time of each gather. Temporary traps are placed adjacent to existing roads and remain in place for up to 14 days. Gathering is done outside the normal February through June breeding and foaling season. Usually, horses are gathered to reduce numbers to the lower end of the appropriate management level range to avoid the need for frequent, expensive gathers that may disrupt the herd. Excess horses are transported to the wild horse management facility in Litchfield.

### **4.23.2 Incomplete or Unavailable Information**

If monitoring determines the AMLs are not appropriate, then they may be adjusted up or down. Adequate information is available to address the impacts of other resource program actions on wild horses at the planning level of the RMP.

### 4.23.3 Analysis

This analysis defined the levels of effects on wild horses and burros as follows:

**Negligible:** Wild horses would not be affected, or the effects would be at or below the level of detection. Impacts would be so slight that they would not be of any measurable or perceptible consequence to the population, health, distribution, or wild, free-roaming character of the animals.

**Minor:** The effects on wild horses would be detectable but localized, small, and of little consequence to the population, health, distribution, or wild, free-roaming character of the animals. Mitigating measures, if needed to offset adverse effects, would be simple and successful.

**Moderate:** The effects on wild horses would be readily detectable and localized, with consequences to the population, health, distribution or wild, free-roaming character of the animals. Mitigating measures, if needed to offset adverse effects, would be extensive and probably be successful.

**Major:** The effects on wild horses would be obvious and would result in substantial consequences to the population, health, distribution, or wild, free-roaming character of the animals. Extensive mitigating measures would be needed to offset adverse effects, and their success would not be guaranteed.

### 4.23.4 General Impacts

Cultural resources will be identified at the project level and impacts will be mitigated as necessary. Proposed management for cultural resources will have beneficial impacts to wild horses by restricting uses/activities in areas where horses occur.

Management emphasis for protecting or restoring soil conditions will have minor impacts to wild horses. Although the degree of emphasis on soil health varies, the restrictions for heavy equipment, tools used for recovering areas in degraded condition, road placement, etc. will have a beneficial impact overall for wild horses by limiting activities to the most suitable soils. Horses will be managed at appropriate management levels and these levels will be reduced should impacts to soils be attributed to wild horses.

Wildlife management actions that emphasize habitat improvement in uplands and riparian areas, as well as reduction of invasive juniper, cheatgrass, and other annual grasses, will have beneficial impacts on wild horses by also improving forage conditions and potential water availability. Maintenance of existing exclosures (> 40 acres each) will not impact wild horses because they have adjusted to their presence already. New exclosures will have to be analyzed at the project level and specifics identified to minimize impacts from new fence construction, possible changes in herd movement, and changes in access to water.

Proposed land acquisitions would benefit wild horses by minimizing management problems associated with use of private lands within HMAs by wild horses. Land disposals, ROWs, and utility corridor management actions will have negligible impact to wild horses and burros as described.

Gathering horses in response to stabilization and rehabilitation plans for wildfire and vegetation treatments will have a temporary minor impact to herd numbers. Exclosure fences to protect treated areas may impact movement within HMAs, depending on the exclosure size. Such range improvements would benefit wild horses, as well as livestock, by increasing the health of individuals and thereby reducing the potential that the carrying capacity could drop below AMLs during drought periods; this is considered a benefit despite the general recognition that water availability rather than forage is more limiting to wild horse populations.

#### 4.23.5 Analysis of the Preferred Alternative

The Preferred Alternative would result in negligible impacts to wild horses. The Preferred Alternative proposes to maintain horses in the Red Rock HMA at the AML Of 16-25 head. This decision was made in response to comments from the Klamath Tribes and wild horse groups.

Increased emphasis on restoring ecosystems and habitats that are not fully functioning or are unhealthy and protecting culturally sensitive areas will have priority. Juniper treatments would add to restoring unhealthy ecosystems by improving biological diversity. Wildlife habitat conditions would be improved by increasing diverse vegetation and protecting soils, reducing the potential for invasive species, and increasing the overall productivity of the range.

Up to 10,000 acres of prescribed burn and fire use treatments would be allowed annually, and up to 10,000 acres of mechanical and hand treatment would be implemented throughout the AFO including the HMA. Use of prescribed fire and rehabilitation of treated areas could result in an increase in forage quality and quantity to be available for wild horses, livestock, and wildlife in the long term. Gathering too often can stress the animals by mixing individual bands of horses, splitting mares and foals, increasing potential injuries caused by gather operations on the range, at the gather site, and during transportation. In the long term, vegetative treatments to restore unhealthy ecosystems, protect unique vegetation associations, and improve habitat conditions for wild horses, wildlife, and livestock, will have beneficial impacts by increasing desirable vegetation, protecting soils, reducing the potential for invasive species, and increasing the overall productivity of the range.

#### 4.23.6 Cumulative Effects

The area of analysis for cumulative impacts of the Preferred Alternative on wild horses is defined as the area within the boundary of the Red Rock HMA.

Cumulative effects to wild horses revolve around forage and water availability, as well as human disturbance, including recreation, development, and livestock grazing. Over the long term, the following would benefit wild horses and burros by improving their overall habitat:

- fuels and vegetation treatments,
- intensive grazing strategies, and
- developing water sources for livestock and wildlife.

Planned juniper treatments would continue to increase in the Red Rock HMA under the *Sagebrush Habitat Restoration Plan* increasing forage production in the long term. These actions could cumulatively affect wild horses in the short term by changing their movement and distribution within herd areas in an attempt to avoid re-occurring activities. However, the resulting additional forage would help maintain the health of the herd. This would assist in maintaining herd viability.

Indirect impacts to horses generally occur after a stress event such as gathering. Indirect impacts may include spontaneous abortions, increased social displacement of band members, and conflicts such as brief skirmishes between studs.

No significant adverse cumulative effects to wild hoses are expected to occur.

#### **4.23.7 Mitigation Measures**

Use a staggered schedule for fuels/vegetation treatments within Red Rock HMA to reduce the short-term adverse impacts to wild horses from treated areas that require rest from livestock or wild horse grazing until vegetation has recovered. Locate new fences to support both livestock grazing strategies and protect vegetation treatments without building multiple fences for single purposes in the same areas.

All wild horses removed from the herds would be placed in BLM's adoption program or otherwise placed in long-term care.

#### **4.23.8 Unavoidable Adverse Impacts**

The frequent gathers to reduce the horses on the HMA would cause stress and include spontaneous abortions, increased social displacement of band members, and conflicts such as brief skirmishes between studs.

#### **4.23.9 Short-Term Uses Versus Long-Term Productivity**

Use of prescribed fire and rehabilitation of treated areas could result in short-term herd disruption. However, an increase in forage quality and quantity available to wild horses, livestock, and wildlife habitat in the long term would result in moderate benefits.

#### **4.23.10 Irreversible and Irretrievable Impacts**

There are no irreversible and irretrievable impacts.

## 4.24 Potential Effects on Wildlife and Fisheries

This section describes direct, indirect, and cumulative effects on terrestrial and aquatic wildlife as a result of implementing proposed management actions under the Preferred Alternative. For all species, habitat is the key concern, since it deals with the fundamental ability of the land to support a given species year-round (or seasonally, in the case of migratory birds).

### 4.24.1 Methodology and Assumptions

Land use decisions may affect individuals, populations, or wildlife habitats. The information used in this analysis was obtained from the following sources:

- agency and scientific literature,
- interdisciplinary team members and contractors,
- existing plans
- wildlife databases,
- field site visits, and
- professional judgment of BLM and other wildlife biologists.

This information, in addition to existing knowledge of species-habitat relationships and general knowledge of the field office area, was used to assess impacts. The planning approach regarding terrestrial and aquatic wildlife is to determine which activities or actions are likely to affect wildlife, whether effects are adverse or beneficial, and what type of mitigation, if any, can be used to minimize adverse effects.

The analysis considered an effect on terrestrial and aquatic wildlife *adverse* if it would do the following:

- cause a loss of individuals of a species or population;
- interfere significantly with the movement of a resident or migratory species;
- reduce habitat quality or acreage, especially if it prevents the reestablishing of native biological communities that inhabited the area before the action; or
- harm, harass, or destroy a species, habitat, or natural community that is recognized for scientific, ecological, recreational, or commercial importance.

In addition, for special status species and their habitat, an effect was considered adverse and requiring mitigation if it would harm, harass, or destroy any special-status species, its habitat, migration corridors, or breeding areas.

The analysis considered an effect on terrestrial and aquatic wildlife *beneficial* if it would do the following:

- maintain or increase individuals of a species or population;
- protect or facilitate the movement of a resident or migratory species; or
- maintain or increase habitat quality or acreage, especially if it promotes native biological communities.

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This analysis includes a number of assumptions concerning BLM resource programs that have significant effects on terrestrial and aquatic wildlife:

- The wildlife management program would adhere to regulations and policies in BLM Manual 6840, the Endangered Species Act, the FLPMA, and the Wilderness Act of 1964.
- AMPs would be developed and monitored, and activities would be conducted in compliance with BLM's S&Gs. The S&Gs include special consideration for sensitive species and vulnerable biological resources.
- Management actions would be compatible with guidelines in the "Conservation Strategy for Sage-Grouse (*Centrocercus urophasianus*) and Sagebrush Ecosystems within the Buffalo-Skedaddle Population Management Unit", Likely Tablelands/Rocky Prairie and Devil's Garden/Clear Lake sage-grouse conservation strategies and USFWS biological opinions concerning implementation of PRMP programs.
- Project-level implementation plans would incorporate guidance from management plans identified in this PRMP (see Chapter 2.24) or to which BLM is signatory. Projects would incorporate expert opinion, literature review, and local field work, in order to develop sound strategies for implementation actions that would minimize adverse effects on wildlife and wildlife habitat.
- Project-level effects would be suitably mitigated under NEPA standards for AMPs and other BLM plans.
- Management actions affecting special-status species would have similar effects on other native wildlife utilizing the same habitats.
- Native wildlife in general would usually benefit from measures protecting and enhancing habitats for special status species.
- Management of riparian areas would adhere to riparian health standards and guidelines.

Resource programs were evaluated under the Preferred Alternative to determine their potential for effects on the following major terrestrial and aquatic wildlife groupings:

- Federally listed species
- State-listed and BLM sensitive species
- Ungulates (primarily deer and pronghorn)
- Sagebrush ecosystems and sagebrush-obligate species
- Other native wildlife species
- Native and non-native fish and other aquatic species
- Non-native wildlife species

Resource and management programs having potentially substantial effects on terrestrial and aquatic wildlife and affecting large areas of land include the following:

- Energy and Mineral Resources
- Fire and Fuels
- Forestry
- Lands and Realty



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- Livestock Grazing and Wild Horse Management
- Recreation and Travel Management
- Special Designations
- Vegetation and Noxious Weed Management
- Water Quality, Supply, and Hydrologic Function
- Wildlife and Fisheries

### 4.24.2 Incomplete or Unavailable Information

Adequate information exists on the occurrence, season of use, consequences of management actions, and relative suitability of habitats for regional species of wildlife. This information is based on the professional knowledge and judgment of BLM resource planners and private resource contractors; known species-habitat relationships, species occurrence databases, current management plans, and agency and scientific literature. However, information on the distribution and population trends for some species is limited.

### 4.24.3 Analysis

Effects of management actions are described in relation to existing habitat conditions, thus forming a baseline for comparison. These conditions are described in Chapter 3.25, unless otherwise noted. Most impacts on wildlife are difficult to quantify with precision. Therefore, beneficial and adverse effects are ranked according to the following terms describing the general extent and magnitude of anticipated effects.

**No effect:** The action would have no measurable or perceptible effect on wildlife.

**Negligible effect:** Effects would be barely detectable, highly localized, short-term, and of no consequence to the population of any wildlife species.

**Minor effect:** Impacts on wildlife would be detectable but localized. Effects would generally be short-term but occasionally long-term. Consequences for any wildlife species would be small. If mitigation measures are needed to offset adverse effects, they would be simple and successful.

**Moderate effect:** Impacts on wildlife would be readily detectable and less localized. Effects may be short or long-term but would have consequences at the population level. If mitigation measures are needed to offset adverse effects, they would be extensive and probably successful.

**Major effect:** Impacts on wildlife would be obvious and widespread. Some effects may be large and short-term; but most would have long-term consequences for the management area or region. Extensive mitigation measures would be required to offset adverse effects, and success would not be guaranteed.

**Short-term:** Changes affecting wildlife habitats or populations (generally) lasting less than a single season or year.

**Long-term:** Changes affecting wildlife habitats or populations lasting longer than a single season or year.

#### **4.24.4 Impacts Common to All Wildlife Groups**

A variety of management actions are designed specifically for the protection, restoration, or enhancement of wildlife habitats or populations. In some cases, certain management activities of the major programs for BLM can result in direct and indirect, and or substantial impacts for wildlife. These impacts are disclosed in this section by resource program.

##### **4.24.4.1 Energy and Minerals**

Energy and locatable mineral exploration and development require NEPA analysis and must remain compliant with measures adopted in this RMP. WSAs (56,648 acres) would be closed to leasable and saleable mineral extraction, effectively preventing adverse impacts in these areas. With regard to ACECs, these vary in number and size—and in their availability for mineral leasing—according to the management alternative. However, because of restrictive stipulations, adverse impacts would likely be negligible or minor for most species of wildlife. Outside these special management areas, potential and demand for energy and mineral resources remains low. Therefore, the program is not likely to have substantial adverse effects on wildlife.

Mineral development would potentially have short and long-term adverse impacts on wildlife, particularly habitats of wild ungulates. This would result from the direct removal of native vegetation (especially sagebrush and bitterbrush habitats) and alteration of site conditions (especially hydrologic function). Vegetation type-conversions are possible, plus indirect effects, such as the introduction and proliferation of noxious weeds unpalatable to wild ungulates. The severity of these effects depends upon the nature and extent of the mineral extraction activity, its location, and the success of reclamation efforts. These effects would be minimized or mitigated by restrictive stipulations in project-specific NEPA documents.

Saleable mineral extraction would be permitted throughout the management area, except within WSAs and current ACECs. The primary saleable mineral activities would be decorative rock collecting and small-scale sand-and-cinder operations. These are minor activities that—when in compliance with land health standards and guidelines—would have negligible effects on special-status or other wildlife.

##### **4.24.4.2 Fire and Fuels**

Wildland fire management and fuels management areas will vary according to management constraints (e.g., WSAs and ACECs) and management prescription (e.g., AMR and WFU). In the short term, disturbance caused by firefighting and fuels management activities (e.g., fireline construction and use of heavy equipment) would have minor to moderate adverse effects on wildlife habitats. However, potential loss of habitat from catastrophic wildfire far outweighs the short-term effects if such actions are not taken.

Many areas are at risk from catastrophic wildfire due to excessive fuel accumulation resulting from historic fire suppression. Full suppression would continue to protect existing wildlife habitat (particularly for greater sage-grouse and other sagebrush-obligate species) in the short term by decreasing the area subject to catastrophic wildfire. However, considering the area subject to full suppression and constraints on WFU and prescribed fire, there would be major long-term adverse effects for sage-grouse and other wildlife. For example, full suppression would further increase the size and density of big sagebrush (more fuel accumulation) and exacerbate the loss of understory forbs and grasses (critical to young sage-grouse, and important for ungulates and other wildlife), thus leading to further habitat degradation and instability. Despite this, fuels management programs would attempt to maintain healthy ecosystems and achieve desired future conditions and land management goals.

### 4.24.4.3 Forestry

Forests would be managed to promote ecosystem health and protect and improve wildlife habitats. Management of 13,800 acres as commercial forest would bring human disturbance and the effects of heavy equipment. Timber harvesting operations would remove trees and cover and disturb, alter, or remove ground cover. However, appropriate harvest methods and stipulations would protect water quality, protect or improve wildlife habitat, and increase forest health. For instance, riparian vegetation would be preserved as a buffer adjacent to streams and rivers, thereby preserving shade, minimizing sedimentation, and protecting aquatic habitats for fish and other wildlife. Timber harvesting could have minor to major short-term (or somewhat longer) adverse effects on many forest mammals and birds. Nonetheless, minor to major long-term benefits should eventually result from an overall increase in forest health. Opening the canopy will benefit avian predators and permit light to reach the ground--and this will favor the growth of understory vegetation (shrubs, forbs, and grasses) on which most forest wildlife depend. Also, woody debris (snags, downed logs, and litter) provides minor to moderate short and long-term benefits for forest wildlife by providing shelter and escape cover. Leaving a healthy old growth component will benefit species requiring mature habitats, particularly nesting and roosting birds and bats.

Mechanical treatments of invasive juniper would result in short-term disturbance of soils, sagebrush and riparian vegetation, and increase soil erosion and stream sedimentation. However, when juniper is controlled and site-potential restored, there will be substantial long-term benefits for many species of wildlife. Firewood cutting in juniper stands will also have short-term adverse effects—but follow-up treatments would ensure regeneration of understory vegetation and produce long-term benefits. Effects of juniper removal on special status and certain other wildlife would be monitored and management modified as necessary to minimize adverse effects.

This PRMP incorporates practical conservation measures from BLM Nevada's "Migratory Bird Best Management Practices for the Sagebrush Biome" and the (BLM-Nevada) "Partners-in-Flight Bird Conservation Plan" (Paige and Ritter 1999). Juniper reduction work—depending on scale—could make significant contributions to improving shrub-steppe habitats for sagebrush-obligate species. On appropriate sites, maintenance of old growth juniper will continue to benefit many songbirds (e.g., pinyon jay, juniper titmouse, and green-tailed towhee). Implementation of these measures, plus conformity to land health standards, will result in major long-term benefits for biodiversity and enhanced habitat conditions for native wildlife.

Various silviculture practices may have short-term adverse effects on mule deer and pronghorn from human disturbance, and removal or alteration of understory vegetation. Effects will be localized and temporary. The long-term effects of these practices are likely to benefit vegetation communities and wildlife (especially wild ungulates) by enhancing shrub and herbaceous understory vegetation, improving forested riparian areas, restoring and improving selected aspen stands, controlling noxious weeds, and restoring roads to minimize erosion effects on adjacent plant communities. In certain areas, large-scale juniper reduction for biomass power generation could raise groundwater levels in riparian/wetland areas and cause a beneficial type-conversion from juniper-dominated woodlands to shrub associations that would benefit mule deer and pronghorn.

### 4.24.4.4 Lands and Realty

Utility corridors and other ROWs would potentially have adverse effects on vegetation and wildlife from construction disturbance and alterations that permanently degrade or destroy wildlife habitats. They also encourage the spread of noxious weeds, interfere with mule deer and pronghorn travel and (seasonal) migration, and create numerous artificial perches for raptors, artificially favoring these predators.

These effects could be reduced or minimized through project-specific measures such as locating new utility development in existing corridors and aggressively controlling noxious weeds along roads and right-of-ways. There are short- and long-term impacts—many of which would be permanent—that require wildlife to adjust to changes in their environment. This may or may not be possible. However, the narrow, linear nature of disturbance caused by these projects, combined with aerial or buried structural components, will limit long-term effects on most species of wildlife.

On the other hand, creation of numerous artificial perch sites for raptors may have significant and permanent deleterious effects on sage-grouse. With this in mind, giving priority to avoidance of sage-grouse habitats when planning these kinds of development may help minimize excessive predation on these birds. Effects on other prey species are not likely to be substantial. The relatively low prevalence of these kinds of development, plus the low likelihood of future developments, is expected to result in negligible adverse effects on wildlife for the management area as a whole.

High risk to wildlife habitats comes from active promotion of new facilities development; which would result in additional habitat losses, particularly for sagebrush-dependent wildlife. However, (future) utility, transportation, and telecommunications projects require separate NEPA analysis and permits. These documents and permits would identify and require appropriate measures to minimize and mitigate adverse effects on wildlife and wildlife habitats. Specific measures to minimize habitat degradation and erosion and sedimentation of streams would be identified and incorporated in project plans before they are approved. Potential adverse effects are negligible to minor.

Closing and rehabilitating selected roads and installing erosion-control devices would be implemented under the Preferred Alternative. Road rehabilitation on 10,154 acres known not to be in compliance with land health standards would especially benefit large mammal habitats. Effects would be most beneficial for mule deer in bitterbrush, mountain mahogany, meadows, and open stands of oak and juniper. Benefits would be greatest for pronghorn in low sagebrush and meadow habitats. Road rehabilitation and erosion control would also benefit other wildlife by promoting vigor and structural diversity in native vegetation and increasing biodiversity.

Land acquisitions priorities would focus on acquisition of private lands (from willing sellers) with high ecological or historical value within or adjacent to large, contiguous tracts of public land. Management of acquired lands must comply with NEPA and the prescriptions of this RMP. Such acquisitions are likely to benefit large mammals, sagebrush-obligate, and riparian wildlife by enlarging and consolidating habitats and improving management efficiency. Benefits would be greatest for sage-grouse, mule deer and pronghorn (especially in fawning/kidding areas, seasonal migration routes, and foraging areas).

With the acquisition of private lands to protect natural resources, public access on newly acquired lands will need to be assessed and managed to prevent unintended impacts. Lands eligible for disposal are isolated, small, and difficult to manage and have little resource value. Therefore, adverse effects from land disposal would be negligible.

#### **4.24.4.5 Livestock Grazing and Wild Horse Management**

Localized over-grazing from livestock and wild horses and soil damage is possible – especially in riparian and wetland habitats and around watering areas. However, specific measures protecting springs and riparian habitats, primarily under the wildlife, vegetation, and water quality programs, are designed to greatly reduce or avoid this eventuality. There is also concern about livestock grazing impacts to sagebrush and grassland habitats. Historically, livestock grazing is recognized as a major factor contributing to the degradation of sagebrush ecosystems, especially plant diversity and structure (Miller and Eddleman, 2001).

Site-specific rangeland improvements would be pursued using a range of techniques (e.g., modifying grazing practices, prescribed fire, and mechanical, chemical, and biological treatment of vegetation).

Rangeland improvements would be site-specific. Techniques would include:

- modification of grazing practices,
- prescribe fire and WFU,
- mechanical and chemical manipulations, and
- biological agents.

These practices would result in incremental improvement in habitat conditions for terrestrial and aquatic wildlife over the 20-year span of this PRMP. Management of riparian and wetland vegetation would primarily involve refinement of current grazing management strategies to benefit fish and other aquatic and terrestrial wildlife that depend on these habitats.

When too numerous, wild horses damage springs and riparian habitats, causing excessive erosion and accelerating gully formation in streambeds. They also do considerable damage to uplands areas. Therefore, wild horse herds would be managed at or below established AMLs in order to sustain natural and healthy ecological conditions and achieve land health standards.

#### 4.24.4.6 Recreation and Travel Management

Recreation in certain areas and at certain times would have minor to moderate direct adverse effects on wildlife or indirect adverse effects on habitats from recreational activities and human presence. This is notably true for big-game, breeding waterfowl, upland game birds (primarily sage-grouse), and nesting raptors. These impacts are not measurable on a year-to-year basis due to variability in animal behavior regarding use areas and season of use, as well as the effects of weather on road conditions and OHV access.

Adverse effects from recreation depend on the nature, intensity, and extent of surface-disturbing activities. A large portion of the management area—except for Special Designation such as WSAs, SRMAs, and ACECs—would be managed as an extensive recreation area. Recreation may have adverse effects on certain species of wildlife at certain times in their life cycle or on species that are especially vulnerable to disturbance (i.e., special status species). Examples would be greater sage-grouse when on their leks (breeding display sites), roosting and breeding bats, and nesting raptors. However, effects would be minimized through protective measures prescribed in project-level NEPA documents and incorporated in this PRMP.

The most important factor—by far—is the extent of OHV access and degree of OHV recreation (i.e., cross-country travel). Limitations on OHVs would directly benefit wild ungulates by reducing disturbance of vegetation and soils, thereby reducing habitat destruction by decreasing erosion and the likelihood of weed introductions and proliferation. Judicious seasonal and permanent road closures would also limit excessive disturbance of mule deer and pronghorn (on wintering grounds and during critical times in their reproductive cycles) caused by motor vehicle use and increased human presence in sensitive areas.

ROS designations (particularly regarding motorized access) and establishing a ‘designated’ route network would minimize disruption of wildlife habitats and disturbance at inappropriate times of the year, or in sensitive locations.

Improvements in route design and construction, re-routing roads and trails, limiting use during critical times of year (i.e., seasonal protective measures and buffer zones), and permanently closing routes, where necessary, would all be effective in limiting adverse effects on wildlife.

OHV cross-country travel would have minor adverse impacts on wildlife if limited to very small areas and habitats important to special status species are avoided. In a similar manner, OHV events could be allowed under permit in suitable areas and impacts assessed at the time of application. Because surveys are not routinely conducted to assess degree of use by special status species, an evaluation of suitability for OHV recreation must be completed for each permitted use. Mitigation would be specific to the site, and would generally mean avoidance of the area.

Vehicular recreation in the Cinder Cone OHV Management Area would continue to have major adverse localized effects on wildlife—particularly big-game—but because of the small area involved, this would have negligible overall impacts in the context of the entire management area. Areas ‘Closed’ to OHVs due to special designations or seasonal closures would result in minor benefits for wildlife.

Campers would be informed of CDFG regulations requiring campsite placement at least 200-300 feet from small water sources (defined as less than one acre) so that wildlife has access to water. The restriction would also apply to creeks, rivers, lakes, and reservoirs in order to preserve water quality and riparian vegetation and allow free access to wildlife.

OHV closures and re-routing would benefit aquatic wildlife by protecting soils and preserving habitat integrity. Limiting vehicles to existing or designated routes, and other restrictions that apply in WSAs and WSRs, would serve to protect aquatic habitats in these areas.

Boating opportunities are available on several reservoirs and would have minor impacts on wildlife, primarily nesting waterfowl. The potential for adverse effects is small because of limited boating opportunities. The Preferred Alternative places major restrictions on this activity.

Hunting, hiking, and horseback riding are the principal non-motorized activities with potential for disturbing wildlife at certain times or in certain locations. However, effects are disbursed and highly variable so they cannot be quantified. Due to the nature of these activities, impacts primarily affect individual animals rather than populations, so they are of negligible significance.

#### **4.24.4.7 Special Designations**

Special designations (WSAs, ACECs, and WSRs) would be managed to protect and enhance habitats for special-status species—where these areas contain suitable habitats. WSAs (56,648 acres) in particular, will continue to protect important ungulate habitats and habitats for sagebrush-obligate wildlife from excessive human disturbance and destructive land use modifications. Similar benefits would accrue for fish and other aquatic wildlife from protections afforded by WSR designations. Minor to moderate long-term benefits are expected from the presence of these special management areas. There would be no significant effects on wildlife from measures protecting historic trails or establishing scenic byways and vistas due to the small area involved and location along roads and highways.

#### **4.24.4.8 Vegetation, Special Status Plants, and Noxious Weed Management**

Vegetation management would provide substantial benefits by protecting, restoring, or enhancing riparian, sagebrush, aspen, and other wildlife habitats. Sagebrush habitats would be managed to meet land health standards by restoring habitats degraded by historical overgrazing and fire protection.

This has resulted in habitat degradation by invasive native plants and alien weeds and excessive accumulation of fuels (particularly in old stands of sagebrush and mountain mahogany).

The IWM program is aimed at reducing or eliminating alien or invasive plants. Following treatment and subsequent restoration of native vegetation, minor to major long-term benefits may be expected from increases in biodiversity and reestablishing suitable forage and cover for native wildlife. Sagebrush habitats have the most to gain. Destroying—or at least containing—cheatgrass and medusahead would greatly benefit wildlife that depends on sagebrush habitats. An important focus of IWM is the maintenance, restoration, and enhancement of special status plant populations. A number of special status plants are of great importance to wildlife; therefore, controlling alien and invasive weeds affecting these special plants will preserve or enhance biodiversity, forage, and cover and would have moderate to major long-term benefits for wildlife that rely on special-status plants.

### 4.24.4.9 Water Quality, Supply, and Hydrologic Function

Water management decisions will have major beneficial effects on wildlife resources. Wildlife would benefit from many actions designed to protect aquatic and riparian habitats and make significant progress toward achieving land health standards and PFC. Isolated springs and wetlands would be protected by adjusting livestock grazing, implementing best management practices, and closing selected roads. This would increase shrub growth along upland borders in riparian areas, stabilize water flow, and increase volume in (normally dry) stream channels, providing an important source of surface water for mule deer, quail, and other terrestrial wildlife. Water right acquisitions would stabilize and enhance stream flow in habitats that could support large populations of fish. Restoration of hydrologic function would focus on stream and riparian/wetland areas that are not in PFC. BMPs would be developed and implemented to achieve these goals. Water sources, particularly springs and streams, would be managed to protect riparian vegetation and ensure an adequate supply of high-quality water.

Planting, seeding, and manipulation of vegetation (particularly willows) along stream banks are important to preserve water quality and decrease water temperature. This would greatly improve aquatic habitats, especially for native cold-water fish. Comprehensive and routine inventory would document these benefits. Overall, this would have moderate to major long-term benefits for all wildlife, especially riparian and aquatic species.

### 4.24.4.10 Wildlife and Fisheries

Management actions for all resource programs would follow the terms and conditions specified in biological opinions and recovery plans for the following federally listed species:

- bald eagle,
- northern spotted owl,
- Modoc sucker,
- Lost River sucker,
- shortnose sucker, and
- Shasta crayfish.

AMPs, wildfire and fuel-reduction treatments, recreation, and other BLM projects, would comply with the Endangered Species Act and NEPA—with mitigation to avoid or offset adverse effects on these species.

## Chapter 4: ENVIRONMENTAL CONSEQUENCES

Management could have some level of minor adverse impacts on state-listed or BLM sensitive wildlife. Lack of information on occurrence and, if present, population size and distribution make determining impacts problematic. Therefore, BLM management actions that may affect these species would undergo site-specific analysis to determine if protective measures or mitigation is required. However, management is not expected to have adverse impact on federally listed, BLM-sensitive, state-listed or state sensitive wildlife.

Development of new HMPs for bald eagle nesting and roosting sites would ensure suitable habitat management and protect previously unknown sites. Populations are expected to remain stable or increase. If an Oregon spotted frog or pygmy rabbit population is discovered, habitat would be managed to sustain the population.

In a similar manner, if a western yellow-billed cuckoo, western burrowing owl, western willow flycatcher, bank swallow, or tricolored blackbird population is discovered, the same management would apply. However; in the latter case, known habitats for these species would be protected, even if their presence is not evident, since management actions could have short-term adverse effects. These species are not known to breed in the AFO management area, so management actions are very unlikely to affect these birds.

Greater sandhill cranes are, however, known to nest in the management area, but use and nesting areas vary from year-to-year. When a nesting pair is discovered, the nest site would be protected for that season.

Actions that may cause direct disturbance of special-status wildlife or active raptor nests (protected under CDFG code 3503.5) would be avoided or minimized using year-round or seasonal use restrictions and distance buffers applied at the project level. (See Table 2.24-3.) Restrictions may apply to mining, timber operations, livestock grazing, recreation and other activities. Guidelines are flexible; specific dates and distances may vary depending on the action proposed, local breeding chronology, and local weather patterns.

BLM lands will be managed to meet land health standard 5 (biodiversity). Adherence to this standard will promote diverse and healthy wildlife populations by improving vegetation structure, particularly diverse age-classes and seral stages, as well as increasing vigor, patch size, and habitat connectivity. Specific actions are discussed under many other programs (e.g., vegetation, weed management, juniper management, water quality and supply, livestock grazing, and wildfire and fuels management, among others). Of special concern is restoring PFC to streams, wetlands, springs, and meadows. When considered overall, implementation of these measures to fulfill the biodiversity standard would have minor to major long-term benefits for wildlife.

Standards 2 (streams) and 4 (riparian areas and wetlands) from BLM's land health standards, plus aquatic and riparian PFC are very important for aquatic wildlife because they address stream characteristics, vegetation diversity and vigor, bank stability, erosion, and high-flow events. Restoration and rehabilitation projects (under a variety of resource programs) that insure minimum pool depths, protect or provide clean spawning gravels, stabilize stream banks and protect riparian vegetation would have minor to moderate long-term benefits for aquatic and riparian wildlife.

Greater sage-grouse habitat—which constitutes a substantial portion of sagebrush habitats in the management area—would be managed according to sage-grouse conservation strategies incorporated in this PRMP. Numerous leks (breeding display sites) would be protected. This would also benefit other sagebrush-obligate species and wild ungulates.



Ecosystem management that includes juniper removal, weed control, and prescribed fire, and other measures will improve vigor and diversity and extend sagebrush and bitterbrush communities. Even incremental improvements would have significant benefits for mule deer, pronghorn, and other wildlife, in addition to sage-grouse.

Most BLM lands would be managed to achieve their natural site potential. Measures to prevent habitat fragmentation and improve or restore sagebrush-steppe and other shrub communities will provide short and long-term benefits for native wildlife. As plant communities approach site potential, a greater diversity of species and larger numbers of animals will utilize these habitats.

Aspen delineation, restoration, and enhancement would continue throughout the life of this PRMP. Individual projects that enhance stand condition will benefit wildlife that relies on healthy, multi-aged stands. Protecting aspen saplings until they reach at least six feet in height would ensure that trees reach maturity and would allow stands to remain healthy or increase in size. Bitterbrush, and other shrub habitats, would be managed on a case-by-case basis, with efforts focused on improving habitat conditions.

There would be several management actions to enhance waterfowl production under this PRMP. However—with the exception of special status species—there would be no measures to directly benefit mammals, neo-tropical migratory birds, reptiles, amphibians, or invertebrates. Instead, BLM would concentrate on maintaining, restoring, and enhancing wildlife habitat through measures to achieve compliance with (BLM's) land health standards (especially biodiversity) and PFC for forests, riparian woodlands, shrublands, wetlands and other aquatic habitats. Success in this effort would have major long-term benefits for all native wildlife.

BLM policy is to manage ungulate habitats in cooperation with the CDFG to establish desired habitat conditions. Cooperation will have long-term benefits for big-game—especially for mule deer and pronghorn management—on BLM-administered lands.

Key sage-grouse habitats (and habitats for other special status and sagebrush-obligate species) would be managed to insure that the year-round requirements of these species are met. The effects of grazing would be monitored, and management would be modified (where required), in order to comply with the livestock grazing standards and guidelines and protect or restore affected habitats. Livestock grazing, when considered overall, is likely to have minor to moderate adverse effects on wildlife.

This management would have moderate to major long-term benefits for wildlife—especially deer, pronghorn, sagebrush-obligate, and riparian species.

Other than a few species of game fish, the only desirable non-native species in the management area is the wild turkey. Because turkeys live and feed in native woodland habitats, restoration of these plant communities will favor the survival and proliferation of these birds. Another resident—but undesirable—non-native species is the European starling. It occurs sporadically in association with human activities and does not appear to be a serious threat to native wildlife. However, increases in recreation may encourage some range expansion and lead to increased competition with native hole-nesting birds.

### 4.24.5 Analysis of the Preferred Alternative

The Preferred Alternative is expected to result in minor to moderate adverse effects to wildlife resources, and minor to major beneficial effects when considered both short-term and long-term. Wildlife resources management actions strive manage for biological diversity of wildlife species and habitats.

#### 4.24.5.1 Energy and Minerals

The energy and minerals program under the Preferred Alternative could have short- and long-term adverse impacts on all wildlife habitats in most of the management area (445,997 acres). Proposed actions would have potential for adverse effects on wild ungulates and sagebrush-obligate species. Almost the entire management area would be open to saleable mineral development and locatable mineral exploration—when these activities are deemed compatible with other high-value resources or can be sufficiently mitigated.

Potential effects include direct removal of native vegetation (especially in sagebrush and bitterbrush habitats), alteration of site conditions (especially hydrologic impacts that could result in type-conversion that would supplant the dominant native vegetation) and indirect effects, such as the introduction and spread of noxious weeds unpalatable to ungulates and other wildlife. The potential for energy and mineral development has not been properly assessed, so effects on wildlife are conjectural. However, actions would be subject to NEPA analysis and the conditions imposed by this RMP. There is little interest in energy and mineral development in the AFO management area, so significant adverse effects are not expected and, in any case, are likely to be localized. The only energy and mineral activity likely to have significant effects on wildlife would be expansion of existing—or development of new—aggregate sites. If development occurs in or adjacent to streams, riparian and aquatic habitat degradation or destruction would be likely. However, application of land health standards during the application analysis should eliminate or minimize this possibility.

#### 4.24.5.2 Fire and Fuels Management

The fire and fuels management programs under the Preferred Alternative have the potential for minor to major benefits for terrestrial and aquatic wildlife. *If employed as intended*, the overwhelming use of AMR would provide the necessary fire-fighting flexibility to provide substantial long-term benefits for terrestrial and aquatic wildlife by improving vegetation health and protecting soils and water quality. Benefits would be especially great for sage-grouse and other sagebrush-obligate and special-status wildlife.

General use of AMR could have major value for reducing dangerous fuels and decadent shrubs in sagebrush-steppe habitats while providing the management flexibility to fight fires aggressively where and when this is desirable or necessary. However, despite this possibility, *full suppression fire-fighting is likely to be the rule* and there would be no serious attempt to reintroduce a natural fire régime on 486,047 acres. General use of full suppression would favor late-succession plant communities that are not fire-dependent and do not provide high-quality forage or cover for mule deer or pronghorn (for example). Other serious long-term adverse effects would include dense, heavy growth of big sagebrush and subsequent loss of associated forbs and grasses—and even greater accumulation of fuels.

This will increase the risk of intense, catastrophic wildfires that destroy native seed banks and encourage invasion by noxious weeds. Therefore, long-term adverse effects on sagebrush, montane scrub, and forested habitats are expected—with concomitant effects on special-status wildlife that depend on these habitats. However, 16,998 acres would be subject to WFU, which would substantially increase the chance that natural fires could be used to restore and maintain healthy vegetation and optimal conditions for wildlife.

The fire and fuels treatment programs under the Preferred Alternative would not have substantial adverse effects on fish and other aquatic wildlife in the short term. In fact, full suppression could minimize the area denuded by wildfires, thereby keeping soil erosion and stream sedimentation to a minimum.

However, although AMR would be official policy, de facto full suppression would make matters worse in the long term by increasing the risk of catastrophic wildfire and magnifying its effects. Fires would be more intense, larger areas would be denuded, and soil erosion would be greatly accelerated. Although fuels treatments would be substantially increased under the Preferred Alternative (up to 23,250 acres/year), compared to present management, this would not be sufficient to significantly reduce the incidence and intensity of wildfires and their adverse consequences, especially loss of riparian habitats, erosion, and sedimentation of streams, lakes, and wetlands.

Treatments must also be prioritized and conducted according to recommendations from the sage-grouse conservation strategies. After a period of some years, vegetation response from judiciously applied fuels treatments, resulting from this and other treatment priorities, would benefit most species of wildlife and could provide significant mitigation for the effects of full suppression management. If annual fuels reduction efforts are maximized, and consistently and substantially exceed the rate of fuels accumulation, this may gradually reduce the risk of intense wildfires and their catastrophic effects on aquatic and terrestrial wildlife—if only in sagebrush habitats. When considered overall, management under the Preferred Alternative, when compared to present conditions, would result in improved habitats for deer and pronghorn by reducing the effects of full suppression fire management, senescent plant succession, and overgrazing of key forage species and habitats by livestock and wild horses. Habitats on key ungulate seasonal ranges would also be expected to improve.

Prescribed fire is one of the best and most cost-effective tools for improving wildlife habitats. With careful planning and implementation, prescribed fire (75 to 10,000 acres/year) would be instrumental in improving key wildlife habitats and for initial or follow-up treatment of invasive juniper. With proper burn-site rehabilitation, this would be a valuable tool for restoring degraded shrub (particularly sagebrush), aspen, mountain mahogany, bitterbrush, and meadow habitats—especially for big-game, sage-grouse, and other sagebrush-obligate wildlife. If sufficiently utilized, properly conducted burns could have major long-term benefits for terrestrial and aquatic wildlife under the Preferred Alternative.

Mechanical treatments would be used to a similar extent as prescribed fire (75 to 10,000 acres/year), but would concentrate on wooded habitats, including western juniper. Juniper removal could be extensive and thorough enough to permit reestablishment of bitterbrush and sagebrush habitats and provide substantial benefits for mule deer, songbirds, and other wildlife in aspen and mountain mahogany stands—if conducted nearer to the yearly maximum.

Chemical treatment of hazardous fuels would not have substantial direct impacts on wildlife. Depending on the herbicide, application parameters, and location, beneficial effects on wildlife habitats could be realized where other treatment procedures might not meet (wildlife) resource objectives.

The greatest value for wildlife would be in reducing invasive juniper and controlling noxious weeds and other undesirable vegetation. Chemical treatments could be especially valuable in sagebrush-steppe habitats, where herbicides could be used to effectively control medusahead and cheatgrass, thereby permitting regeneration of native vegetation.

To date, biological treatments have not been used to any degree in the AFO management area. However, as much as 1,250 acres/year could be treated biologically, thus increasing treatment options for resource managers. Potentially, biological methods could be used with good effect, and without significant disturbance of soils or non-target vegetation.

Fuels treatments, followed by rehabilitation (seeding or planting), would improve wildlife habitats—when treatment areas are relatively small and spread throughout a larger landscape.

The flexibility to use non-native as well as native seed would quickly stabilize soils and accelerate growth of forage and cover for wildlife. Use of appropriate non-native seed would reduce the likelihood of noxious weed infestation and subsequent site-conversion and increase the time interval when the dominant vegetation provides good wildlife habitat. The Preferred Alternative requires exclusion of livestock from rehabilitated bitterbrush areas for a period of three to five years to permit establishment of desirable vegetation and improve habitat for wildlife. Native shrub areas would be managed for structural and species diversity and to expand into or reestablish historical shrub communities. Where riparian and wetland areas are concerned, they will be managed to meet land health standards and benefit terrestrial and aquatic wildlife.

#### **4.24.5.3 Forestry**

Mechanical timber-harvesting and prescribed fire would be emphasized in the management of commercial and non-commercial forests—including a juniper reduction component. In harvested areas, wildlife habitat improvements would be achieved through rehabilitation and reforestation efforts. Mitigation measures for sensitive species would be analyzed case-by-case and habitat improvement provisions incorporated in the follow-up NEPA analysis.

Removal of invasive and decadent juniper would have incremental benefits for mule deer and pronghorn by expanding existing habitats. This would be accomplished through prescribed fire, mechanical and hand harvesting, and firewood collecting. Juniper removal in the Tule Mountain WSA would be limited to non-mechanical methods. Juniper reduction efforts would not have adverse effects on aquatic wildlife since standard erosion control measures would be taken, including harvest set-backs around springs, streams, and wetlands. In fact, stream flows may increase in treated watersheds. Juniper woodlands would be managed to meet desired canopy cover and cover-to-forage ratios (see Table 2.24-1) in order to create optimal structural and species diversity over a large area of vegetation. Temporary roads would be rehabilitated to minimize disturbance of big-game and other adverse effects associated with the presence of roads. Juniper would be treated more aggressively under the Preferred Alternative, which would have major long-term benefits for wildlife.

The network of permanent roads would be increased by 10 miles under this alternative. This would permanently remove some vegetation and result in further habitat fragmentation for certain species of wildlife. However, careful planning and judicious road placement would minimize impacts on terrestrial and aquatic wildlife. Avoiding road construction in or near key wildlife habitats and deer and pronghorn winter ranges would be important in this regard. However, most species would adapt to the new roads and increased human use.

#### **4.24.5.4 Livestock Grazing and Wild Horse Management**

Heavy livestock grazing, conducted over many years, has had a major influence on the juniper-infested and degraded condition of numerous rangeland areas, especially those adjacent to springs, streams, meadows, and reservoirs. In addition, livestock continue to spread alien noxious weeds and other undesirable plants. Although adjustments in grazing practices and increased use of fencing have helped repair some areas, there has been little success at bringing many grazing allotments into compliance with land health standards. However, it is still possible to make great improvements to land health under the Preferred Alternative. A turn-around would require stringent monitoring, use of best management practices, and compliance with land health standards. It would also require additional cooperative grazing agreements between BLM and permittees to rectify specific habitat conditions.

The primary objectives of the land health standards (as they relate to livestock grazing) are to increase vegetation quantity, quality, and forage availability; improve water conditions; and maintain diverse and healthy habitats for wildlife. To realize these benefits under this alternative will require significant changes in grazing management and a smoothly functioning, interdisciplinary approach to ensure that sage-grouse conservation strategies are followed and land health standards are achievable.

Management under the Preferred Alternative would not significantly alter the locations, but would, in some cases, alter the intensity of present livestock grazing practices. However, the program would strive to comply with land health standards and guidelines protecting streams, wetlands, and riparian vegetation. This would include new fencing to better control the timing, location, and intensity of grazing in sagebrush habitats. Fencing would be used to further divide existing allotments and—by achieving better control—allow for longer periods of recovery between grazing episodes.

This would help preserve plant vigor and habitat diversity and could have moderate benefits for mule deer and pronghorn. Fencing would also be designed to allow unimpeded movement of wild ungulates. To the extent fencing is used to protect springs, streams, wetlands, and riparian areas, aquatic wildlife would also benefit.

Existing livestock exclosures would be properly maintained—and some (small) additional exclosures added—to control over-grazing and trampling around springs and riparian areas of particular importance to wildlife. Fencing would be passable to big-game (in conformity to BLM wildlife specifications).

Wild horse numbers would be reduced to the established AML in one HMA. This would significantly reduce impacts in and around water sources and other important habitats where these feral animals compete with native wildlife. The increase in forage would be especially valuable for mule deer and pronghorn.

### 4.24.5.5 Recreation and Travel Management

Some important decisions regarding recreation under the Preferred Alternative would prevent or minimize resource damage and protect wildlife in important seasonal use areas (especially key wintering habitats for big-game). The most important decisions would be classification of much of the management area as ‘Primitive’ or SPNM under the ROS, limiting OHVs to existing or designated roads and trails, and seasonal road closures.

These limitations would ensure low levels of vehicle traffic and human use in sensitive wildlife habitats. This, in turn, would aid winter survival, minimize habitat fragmentation, decrease soil erosion and subsequent sedimentation of streams, reduce the spread of noxious weeds, and allow big game to adapt to consistent levels of use on established roads and trails.

Non-motorized boating—or type restrictions—would benefit wildlife by decreasing noise and reducing human-wildlife interaction, primarily in avian breeding and roosting areas. Secondary benefits would include improved water quality (in reservoirs) and a more peaceful natural experience for fishermen and other outdoor enthusiasts. Reducing access on waterways and reservoirs could have mixed effects on aquatic wildlife. Particularly in reservoirs, fishing pressure on non-native species could decrease. This could be detrimental for the native species with which the non-native fish compete. However, reduced access also lowers the potential for accidental introductions of baitfish or undesirable sport-fish that can be highly detrimental to native species.

Tighter controls on fishing, camping, and swimming along stream, lake, and reservoir shorelines would reduce soil and stream bank erosion, and minimize disturbance of terrestrial wildlife in riparian habitats.

Closing important big-game winter range to snowmobile travel would benefit wild ungulates in critical wintering areas.

### 4.24.5.6 Special Designations

Six new ACECs would be established under the Preferred Alternative, thereby increasing (to 29,171 acres) the area benefiting from protection afforded by this designation. Wildlife and wildlife habitats would be protected by ensuring that these special management areas remain in a pristine, natural state, free of significant land-use modifications and excessive disturbance by man. The new ACECs would protect relatively large blocks of unfragmented and undisturbed habitat. Therefore, designation would provide a significant increase in long-term benefits for terrestrial and aquatic wildlife, and special status species. The additional ACECs would be especially valuable for protecting big-game winter ranges, such as the (proposed) Likely Tablelands/Yankee Jim/Fitzhugh Creek ACEC (where there would be substantial benefits for many species of birds and small mammals that also utilize the large meadow system).

Management of scenic byways, vista points, and historic trails would not have significant adverse effects on terrestrial or aquatic wildlife. WSR designations (18.5 miles under the Preferred Alternative) would protect the free-flowing character and pristine condition of the three eligible segments from significant land-use modifications and water flow changes. This would have lasting value for aquatic wildlife, as well as nesting raptors and riparian wildlife.

### 4.24.5.7 Vegetation and Noxious Weed Management

Management would focus on maintaining healthy habitats and restoring those not meeting land health standards. Greenstrips would be important in sagebrush habitats to reduce the risk of (and from) catastrophic wildfires and prevent further loss of habitat for sagebrush-steppe wildlife. Vegetation treatments would be specifically designed to enhance decadent shrub habitats or restore these and other degraded wildlife habitats.

Various actions to improve regeneration and stand health would be conducted on 1,000 acres of aspen, mountain mahogany, and oak woodland habitats. In aspen communities, 500 acres would be protected from livestock grazing, or treated with fire or mechanical procedures, to create diverse age-class structure, expand aspen habitats, and restore senescent or unhealthy stands. This would have long-term benefits for big-game, song birds, and other wildlife. Similar management would apply on an additional 500 acres of mountain mahogany and oak woodland habitats. Management of these habitats would benefit at slightly different species combination and may help maintain populations of wild turkey.

Degraded rangeland would be restored using a step-by-step process beginning with herbicide application for control of exotic annual grasses, and depending on the site, prescribed fire. This would be followed by seeding with locally adapted native and desirable non-native annual and perennial species (permitted under the CA-BLM native plant policy.) Finally, 'greenstrip' firebreaks would be created to protect rehabilitated areas from catastrophic (stand-replacing) grass fires on critical pronghorn and sage-grouse habitats (i.e., low sagebrush and Wyoming big sagebrush communities at risk of type-conversion.)

The Preferred Alternative promotes an ecological approach to the restoration of sagebrush-steppe and mixed chaparral habitats by approximating the natural fire regime in these fire-dependent alliances, plus other measures, to encourage succession toward the desired plant community. Beneficial effects would occur through restoration of sagebrush-steppe and mixed chaparral habitats through the introduction of desirable—but non-native—grasses and forbs into plant communities dominated by exotic annual grasses—especially medusahead.

#### **4.24.5.8 Water Quality, Supply, and Hydrologic Function**

Under the Preferred Alternative sediment intrusion buffer zones  $\geq 50$  feet in width would be employed around vulnerable bodies of water. Management actions (especially exclosure fencing) on selected springs and waterways not meeting land health standards would also be implemented to protect these areas from livestock, wild horses, and—in some cases—big game. This would protect water sources and riparian vegetation important for wild ungulates, small mammals, songbirds, as well as fish and other aquatic wildlife.

Bio-engineering treatments would be used on more than 200 acres to protect soils and vegetation and safeguard wildlife habitats. Sediment intrusion buffer zones and other measures would be used to minimize soil erosion and siltation of streams and fish spawning beds. These measures would contribute to diversification and stability of upland, riparian, and aquatic habitats for all wildlife.

Treatments would be subject to NEPA review; therefore, any potential adverse effects on special-status species would be avoided or reduced. Although small in size, interventions would take place in key habitats, so value for wildlife would be substantial.

Actions designed to preserve or restore water quality, supply, and hydrologic function would be primarily concerned with livestock grazing, and erosion control. Modification of grazing practices for the primary purpose of protecting water quality would include exclosure fencing on 500 acres of riparian habitats adjacent to springs, streams, and wetlands, plus complete livestock exclusion where this is advisable. These exclosures would incorporate or overlap other exclosures protecting important wildlife habitats and archaeological sites. Erosion control measures would include intensive planting of woody vegetation, bank stabilization measures, and bio-engineering interventions (such as strategic placement of downed juniper). Such measures would be conducted on 25 miles of perennial, intermittent, and ephemeral streams. Riparian and adjacent habitats are the most important for wildlife because they are where species diversity and wildlife populations are greatest. The Preferred Alternative would provide significant benefits for water quality and hydrologic function. Where this management is applied, it will have minor long-term benefits for terrestrial and aquatic wildlife.

Actions targeting meadow, riparian, and wetland habitats would also serve to protect special-status wildlife and identify key habitats for future management. Sage-grouse breeding display sites (leks) and other sage-grouse habitat would be protected through measures incorporated in “Conservation Strategies for Sage-grouse and Sagebrush Ecosystems” where specific population management units are identified (Armentrout et al. 2004; Schmidt et al. 2005). These measures would provide long-term benefits for this species. Wildlife would experience minor to moderate long-term benefits from 12 existing ‘guzzlers’—and construction of additional guzzlers—where water scarcity or unreliability is a limiting factor for wildlife populations. Routine monitoring and maintenance of these structures would be emphasized, including enlisting local volunteers for this purpose.

#### **4.24.5.9 Wildlife and Fisheries**

A prime focus for big-game management under the Preferred Alternative would be intensified management of 128,000 acres of priority mule deer habitat and 60,145 acres of key pronghorn habitat. These areas contain important year-round habitats as well as key wintering and fawning/kidding habitats. Management actions would be designed to optimize vegetation health (i.e., improve age-class and species diversity to produce a suitable mixture of foraging and breeding habitats, as well as escape and thermal cover)—especially by adjusting livestock grazing to create proper forage conditions for wintering herds of big-game.

The wildlife program would include various actions to protect or improve riparian habitats that would also benefit aquatic habitats. For example, measures to benefit the willow flycatcher would improve in-stream conditions for native and non-native fish and fencing of selected meadow and riparian areas (primary designed to benefit wild ungulates) would have indirect benefits for aquatic wildlife. Measures designed to directly enhance aquatic habitats would include in-stream modifications (e.g., gravel enhancement, planting woody and emergent vegetation, and bank stabilization) plus additional riparian fencing.

Maintenance and enhancement of existing waterfowl nesting islands, plus creation of new nesting islands and protective fencing (to preserve nesting cover from livestock grazing) on additional reservoirs, would have moderate to major benefits for breeding waterfowl, marsh birds, and shorebirds. When fully implemented, and assuming adequate water levels, the management area could greatly enhance waterfowl production and improve local waterfowl hunting.

### 4.24.6 Summary of Effects of the Preferred Alternative

Although AMR is the stated objective on the vast majority of the management area, full suppression would still apply in some areas. General use of full suppression would continue to favor late-succession plant communities that are not fire-dependent and do not provide high-quality forage or cover. Other serious long-term adverse effects would include dense, heavy growth of big sagebrush and subsequent loss of associated forbs and grasses—and even greater accumulation of fuels. Therefore, long-term adverse effects on sagebrush, montane shrub, and forested habitats are expected—with concomitant effects on special-status wildlife that depend on these habitats. However, treatment of dangerous fuels and senescent vegetation (using prescribed fire, mechanical, chemical, and biological means) would be moderately accelerated under the Preferred Alternative (compared to present management).

If the size and effectiveness of yearly fuels reduction and habitat improvement efforts could outpace the rate of fuels accumulation and vegetation senescence the risk and intensity of wildfires would gradually diminish and wildlife habitats would improve. Substantial fuels reduction and significant habitat improvement is achievable in the most important wildlife habitats over relatively large areas.

There has been varied success at bringing many grazing allotments into compliance with land health standards. A turn-around would require stringent monitoring, use of best management practices, and strict compliance with land health standards. It would also require additional cooperative grazing agreements between BLM and permittees to rectify specific habitat conditions. Accomplishing this under the Preferred Alternative will require significant changes in grazing management and a smoothly functioning, interdisciplinary approach to ensure that sage-grouse conservation strategies are followed and land health standards are achievable. New fencing will be required to better control the timing, location, and intensity of grazing in sagebrush habitats. This would help preserve plant vigor and habitat diversity and could have significant benefits for sagebrush-dependent wildlife.

To the extent fencing is used to protect springs, streams, wetlands, and riparian areas, aquatic wildlife would also benefit. Modification of grazing practices for the primary purpose of protecting water quality would include enclosure fencing on 500 acres of riparian habitats adjacent to springs, streams, and wetlands, plus complete livestock exclusion where this is advisable. Erosion control measures would include intensive planting of woody vegetation, bank stabilization measures, and bio-engineering treatments. Such measures would be conducted on 25 miles of perennial, intermittent, and ephemeral streams. Inter-basin transfer of water would not be permitted under the Preferred Alternative, in order to maintain the natural hydrologic function of drainages and protect habitats of local flora and fauna.



These actions would provide significant benefits for water quality and hydrologic function. Horse numbers would be reduced to the established AML in one HMA. The resulting habitat recovery would have minor long-term benefits for wildlife.

Mechanical timber-harvesting and prescribed fire would be emphasized in the management of commercial and non-commercial forests—including a large juniper reduction component. This would be accomplished through prescribed fire, mechanical and hand harvesting, and firewood collecting. Juniper woodlands would be managed to meet desired canopy cover and cover-to-forage ratios in order to create optimal structural and species diversity over a large area of vegetation. Juniper would be treated aggressively under the Preferred Alternative, resulting in major long-term benefits for wildlife.

Bio-engineering treatments would be used on more than 200 acres to protect soils and vegetation and safeguard wildlife habitats. Sage-grouse breeding display sites and other important sage-grouse habitats would be protected and enhanced. This would include green strips in important sagebrush habitats to reduce the risk and intensity of wildfires and prevent further loss of habitat for sagebrush-steppe wildlife. Vegetation treatments would be specifically designed to restore decadent shrub and other degraded wildlife habitats. A prime focus for big-game management would be intensified management of 128,000 acres of priority mule deer habitat and 60,145 acres of key pronghorn habitat.

Management actions would be designed to optimize vegetation health—especially by adjusting livestock grazing to create proper forage conditions for wintering big-game. Maintenance and enhancement of existing waterfowl nesting islands, plus creation of new nesting islands and protective fencing on additional reservoirs, would have moderate to major benefits for breeding waterfowl and other birdlife. When fully implemented, and assuming adequate water levels, this management could greatly enhance waterfowl production.

Decisions affecting recreation under the Preferred Alternative would prevent or minimize resource damage and protect wildlife in important seasonal use areas. The most important decisions would be classification of much of the management area as ‘Primitive’ or SPNM under the ROS, limiting OHVs to existing or designated roads and trails, and seasonal road closures. These limitations would ensure low levels of vehicle traffic and human use in sensitive wildlife habitats. This in turn, would aid winter survival, minimize habitat fragmentation, decrease soil erosion and subsequent sedimentation of streams, reduce the spread of noxious weeds, and allow big game to adapt to consistent levels of use on established roads and trails. Six new ACECs would be established, thereby increasing (to 29,171 acres) the area benefiting from protection afforded by this designation. The new ACECs would protect relatively large blocks of un-fragmented and undisturbed habitat that is especially beneficial for wintering big game. This would significantly increase long-term benefits for terrestrial (especially big game), aquatic, and special status wildlife.

### 4.24.7 Cumulative Effects

The area of analysis for cumulative impacts on wildlife resources is defined as the AFO boundary. Major uses over the next 20 years are likely to continue and in some cases increase for the following reasons:

- Fish and wildlife development and use would continue at its current rate, or at an increased rate depending on the condition of habitat, which is influenced by terrestrial vegetation health.
- Domestic livestock grazing would continue to affect 97% or less of the areas, with actual grazing use differing depending on the grazing system.
- Outdoor recreation would increase as more people from metropolitan areas utilize recreation opportunities within the AFO area.

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- Wildland fires would continue to change the vegetation landscape, requiring, in some cases, emergency stabilization and rehabilitation.
- Timber production would continue at its current or lower level, perhaps becoming a fuels management activity more than a commercial enterprise.
- Wild horses would be maintained at appropriate management levels.
- Mineral exploration and production are not expected to increase because of the lack of mineral resources except for sand and gravel.
- Wind energy and other renewable energy sources are expected to increase.

Cumulative effects to wildlife resources may result from various environmental processes and management actions occurring on lands adjacent to BLM lands. Adjacent landowners include other BLM offices in California and Nevada; USDA Forest Service; USFWS; Department of Defense; CDFG; Nevada Department of Wildlife; California Lands Commission; California Department of Corrections; various county entities; and private landowners. Primarily, cumulative effects to wildlife resources occur due to effects on habitat. Habitat conversion, degradation, fragmentation, and loss can all adversely affect wildlife, either temporarily or permanently.

Such actions or activities include conversion of lands to residential or agricultural use; invasion of lands by noxious weeds, annual grasses, or other invasive species; juniper treatments; logging or forestry actions; grazing practices; road and trail construction; and fire (wildland and prescribed burns).

BLM projects proposed on lands administered by the AFO would be subject to NEPA documentation and permitting decisions, which would address cumulative effects on a project-level basis.

Management actions that are considered relevant to the evaluation of cumulative impacts on wildlife resources within the AFO area include the following:

- Implementing federal recovery plans and biological opinions for listed species on other federal lands;
- Completing and implementing ongoing multi-agency planning efforts such as those for sage-grouse and juniper management;
- Implementing similar management actions on adjacent lands managed by other BLM field offices and the USDA Forest Service to manage ecosystems to achieve objectives similar to those for BLM-administered lands (i.e., land health standards, Healthy Forests Initiative, ecosystem management);
- Implementation and project-level implementation of other existing or future management plans;
- Acquiring and managing land by the CDFG, including:
  - Revising deer and pronghorn herd plans;
  - Converting native habitats to agricultural uses;
- Water development issues for inter-basin transfer to the City of Reno or other regional areas; and,
- Future geothermal or other energy development.

The continued management and protection of large tracts of land as open space is considered a beneficial cumulative effect to wildlife because it offsets the conversion of lands from agricultural or residential use and maintains large contiguous patches native plant communities as wildlife habitat.

The continued coordination across administrative boundaries with private and public agencies throughout the region as part of BLM's IWM program is considered a beneficial cumulative effect for wildlife. Private lands in the region provide important habitat for wildlife (Northern California Sage-grouse Working Group 2006), and lands adjacent to BLM-administered lands are being invaded by noxious weeds at a similar rate, or higher rate, to those occurring on BLM-administered lands.

In addition to juniper encroachment on BLM-administered lands, encroachment is also occurring on adjacent public and private lands. Harvesting of juniper, for both fuel wood and biomass, is occurring on adjacent public and private lands at some level. While such harvest results in temporary ground disturbance, in addition to the potential for introduction of noxious weeds, BLM's focus on reduction of juniper in the region is considered a major beneficial cumulative effect on wildlife habitat.

Hazardous fuels reduction treatments and even-aged forest management would result in substantial and long-term changes to the ecosystem. In these areas, successive treatments would allow early seral grass and shrub communities to dominate or co-dominate. Thinned forest stands would begin to display late-successional stage characteristics earlier than unmanaged stands. Cumulative effects to wildlife via habitat could be either beneficial or detrimental depending on the specific species considered. Generally, wildlife diversity and abundance would be expected to increase over time. In addition, watershed quality and overall ecosystem function would be expected to improve.

Wildland fire management on USDA Forest Service and private lands could result in cumulative effects on wildlife habitat. Although fire is generally considered beneficial to vegetation resources over the long-term, wildlife can be adversely affected in the short term (displacement, lack of food or cover), or even long-term if the understory that returns post-fire is invasive annual grasses or noxious weeds. Actions such as full fire suppression by BLM or other federal and state agencies can contribute to adverse cumulative effects to wildlife resources by increasing the buildup of fuels and decadence in habitats and increasing the risk of habitat loss due to catastrophic wildfires. The same may also occur if there is a lack of involvement by CDF in conducting prescribed burns on private lands.

Cumulative effects of livestock and wild horse grazing on wildlife resources occurs primarily through effects on vegetation, either via competition for forage or habitat modification. Livestock grazing occurs on adjacent public and private lands, as does grazing by wild horses and burros. BLM currently has existing policy which directs the agency to manage livestock grazing in order to meet land health standards. Additionally, the proposed action includes managing wild horse and burro numbers at or below AML. These actions should serve to reduce adverse cumulative effects to wildlife resources. Livestock grazing will continue on adjacent public and private lands, and will continue to affect wildlife resources; however reductions or disruptions of livestock grazing on private lands could also result in adverse effects to wildlife resources. Private ranch lands in the region currently provide important habitat for various wildlife species including sage-grouse (Northern California Sage-grouse Working Group 2006), pronghorn, deer, and waterfowl. If private landowners were to substantially change operations (convert native lands for grazing or intensify management to offset forage losses on BLM lands) or abandon ranching and sell their land, possibly for other uses), adverse effects to wildlife resources could increase.

The Preferred Alternative would be effective in reducing or reversing adverse cumulative effects due to the emphasis on restoration of vegetation communities toward historic conditions and thus wildlife habitat. In particular, sagebrush-steppe condition and structure, and habitat for associated wildlife species, would be improved by these treatments. Health, longevity, and extent of old-growth juniper and coniferous forests would also be enhanced, which would in turn benefit species utilizing these habitats. Overall, cumulative effects would be primarily beneficial, as BLM strives to promote management to maintain and make significant progress toward meeting land health standards.

#### **4.24.8 Mitigation Measures**

Most proposed actions for wildlife management relate to mitigation measures applied to certain land uses. Mitigation generally takes the form of changes in type of action, the size or magnitude of an action, or changes in timing of an action. Mitigation measures could entail a seasonal or permanent closure to a particular activity or structure, a change in type of action such as using fire versus mechanical fuels reduction, or adjusting the size of an action such as limiting acreage cut or otherwise treated.

Some mitigation measures to reduce impacts to terrestrial and aquatic wildlife and habitat are addressed in Chapter 2.24 Wildlife and Fisheries (i.e., protection for known raptor nests and sage-grouse leks). Mitigation that may be required for a particular action will be addressed as needed at the project level. Mitigation measures would likely reduce significant impacts to habitat and to the viability of terrestrial and aquatic species populations, but may not avoid all adverse impacts.

#### **4.24.9 Unavoidable Adverse Impacts**

Certain unavoidable adverse impacts to terrestrial and aquatic wildlife species and habitat would occur from implementing the Preferred Alternative. These impacts would result in some measure of short-term habitat loss, degradation, fragmentation, and habitat type-conversion from vegetation or fuels reduction treatments, facilities, or road development or off-highway trespass. Impacts could include loss of biodiversity, a reduction in ecological site function or potential, population reduction and/or isolation, and loss of forage or prey base. Mitigation measures described above and in Chapter 2.24 would be employed to reduce these impacts; however some impacts would result to varying degrees.

#### **4.24.10 Short-term Uses versus Long-term Productivity**

Roads built for short-term resource management actions (e.g., forestry, fire-fighting, fuels reduction and rehabilitation, and some mineral development) will cause long-term fragmentation of wildlife habitats unless these roads are closed and rehabilitated. Other management actions which have long-term or chronic adverse effects on wildlife habitats are recreational trail development (particularly if motorized use is permitted), energy structures and ROWs, and grazing by livestock and feral horses. These activities result in habitat loss and fragmentation, and degradation through vehicular and human disturbance, soil erosion, destruction of native vegetation and introduction of noxious weeds (which compete with, and can supplant, native vegetation on disturbed sites.) Such things can permanently decrease ecological site potential and long-term productivity.

#### **4.24.11 Irreversible and Irretrievable Impacts**

The Preferred Alternative has been designed to avoid any irreversible or irretrievable impacts to wildlife. However, irreversible and irretrievable impacts could occur if habitat loss, degradation, or fragmentation results in isolation of wildlife populations into smaller populations that are more susceptible to extinction from random events. Fragmentation could also alter or eliminate migration corridors used by wildlife to move between winter and summer habitats or habitat used for reproduction and upbringing of young. Fragmentation could thus create an irretrievable loss in a species' productivity and adversely affect populations.